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ABSTRACT

Presented are descriptions of activities for both the classroom and the field. Activities frequently integrate environmental education with other subject areas. Each activity description includes specification of grade level, disciplines being taught, concepts, objectives, directions, and equipment requirements when appropriate. Classroom follow-up suggestions are presented for field activities. (RE)

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ENVIRONMENTAL ACTIVITIES TRAINING PROJECT

FIELD ACTIVITIES

SE 027 932

SE

Reprint:
Project I-C-E RMC
1927 Main Street
Green Bay, WI 54301

Environmental Activities Training Project
Fallen Timbers Consortium Schools
1927 Main Street, Green Bay, WI 54301

Title: A Forest Visit

Author: Mrs. Van Vuren
Seymour Community Schools
George Howlett, Jr.
Fallen Timbers Environmental Center

Adapted from: Seymour Schools Outdoor Education
Curriculum and Environmental Awareness,
Centron Films

Grade Level: K-1

Scope and Sequence: This activity is intended as a first visit to Fallen Timbers for kindergarten and first grade.

Disciplines:	I-C-E Concepts:
Science	6. Resources
Art	8. Values & Attitudes
Language Arts	12. Stewardship

Behavioral objectives:

During a walk in the forest, students shall observe colors, textures and shapes as elements of aesthetic quality and life diversity.

Students will discover the role of insect, disease and/or fire as destroyers of a forest.

Equipment:

Student study sheet, crayons, clipboard or cardboard, aluminum foil, one small baggy for each leader.

Pretrip Preparation:

At school or in the log cabin at Fallen Timbers, the students shall view one or more filmstrips from the series, Environmental Awareness, Centron Educational Films.

1. Colors in Nature
2. Patterns in Nature
3. Textures in Nature

A discussion on the impressions created by the filmstrip should follow so that students may verbalize how the slides have affected themselves. These filmstrips are scriptless, thus discussions may begin free of prior suggestion by an unknown adult figure.

Field Trip Activities:

Students walk in small groups led by the teacher or parent volunteers along one of the woodland trails. Groups should space themselves so that immediate groups are able to see each other, yet not interfere with each group's activities, walk at a leisurely pace, allowing time for discovery.

Activity Sequence:

1. Walk

Slowly walk along the forest trail for a short distance to acquaint students with a woodland area as a physical environmental situation. Let students tell of what they see along the trail.

2. Colors in Nature

Stop in an interesting spot. Students will use crayons which match colors in the locality to create a record of colors found on the trip.

Students are to record the different colors in the spaces below and name them for the leader if possible.

Colors Found on the Trail

3. Patterns in Nature

Move on to a spot where several different kinds of trees are growing. Students will observe the different patterns found in leaves and bark on the various trees seen.

a. Basic Shapes

In the boxes below, students will use crayons to record examples of various basic shapes seen in leaves and bark. (For example: triangle, circle, oval, square, rectangle, straight line, wavy line, zig zag line, other shapes and forms)

b. Foil Imprint

Students may stop at a tree having an interesting bark pattern. The leader, assisted by students, will make a bark impression by working a sheet of aluminum foil into the bark pattern. Press the foil with the fingers starting on one side and working to the other side.

c. Follow Up

At the end of the activity, stop; the leader will ask students to note how many different kinds of trees were seen. The objective of this activity stop is to develop discrimination abilities based on variations in basic patterns.

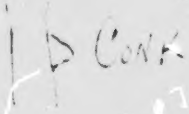
4. Textures in Nature

The leader and the student group will collect one small sample of several different natural objects having various textures. Be selective in collection! Remember that others must also use this study area. The leader shall closely direct the collection. Allow students to verbally describe the feel of each object and to exchange other bits of information about it. The collection of 5-10 small, textured objects should be taken back to the class to be placed in a "feeling box". Each group may, in the classroom, test other groups as to what each object is by allowing students to feel the objects hidden inside the box.

5. Forest Destroyers - Use Aspen Circle Trail

The leader and student group will discover examples of damage done to forest trees by disease, insect attack and fire. Along the forest trails, look for trees showing the following:

Mushroom growths (conks)

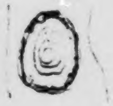


Recently dead elms killed by Dutch elm disease

Barkless old elms killed by Dutch elm disease

Fallen trees having been uprooted due to rotten root systems

Target cankers



In spring look for forest tent caterpiller webs

A fallen cedar trunk on Aspen Circle shows evidence of a long past fire in the forest.

Let the students tell what they think about the importance of a forest and how fire, disease, and insects destroy the forest trees. Let them tell about animal homes and things made from trees and wood.

Note to Leaders: Parts of Fallen Timbers possess a soil/water factor which prevents trees from growing to large size and which provide an environment suitable for early infection by disease agents. These sections do not support a good production forest. It is easy to find examples of disease. Note that mushroom conks indicate heart rot inside a tree trunk.

Follow Up in the Classroom:

1. Use of the feeling box.

2. Discussion on the trip itself. What was seen, what was learned.

3. Tell the story of Smokey the Bear and discuss the danger of forest fires and safety with fire in the woods.

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Environmental Activities Training Project
Fallen Timbers Consortium Schools
1927 Main Street, Green Bay, WI 54301

Environmental Field Activity: Wanted! Dead or Alive

Recommended Grades: K-2 Seasons: Fall/Spring

Author(s):
Marie Hayes
Carol Denis
Patricia Farrell
Pioneer Elementary, Ashwaubenon

Concept(s):
8. Attitudes, Values
9. Change
2. Ecosystem
6. Natural Resources

Integrated with:
Language Arts
Art
Social Studies
Science

Objective(s):

By using their five senses, students will make observations and correctly classify some items found in a natural area into living and non-living in their present state. (Ex. - leaf on a tree is living; leaf fallen from a tree is non-living.)

Rationale:

To better appreciate nature, children may begin at an early age to experience and learn about the way it functions. The uniqueness of nature can be experienced through seeing, hearing, touching, smelling, and tasting. By this activity, children will learn to make simple classification of what things are living or non-living, and what non-living things are associated with the source from which they came.

Directions:

Students should be divided into groups of 5 and, with parent, move from station to station.

Supplies needed: blindfolds, cardboard writing surface, white paper, and crayons

Each of these activities can be done separately or in combination at each place. Teacher or leader should read activity directions at each place.

Activity:

On the walk with our small group we will make frequent stops. At these times, we will stress observing with one of the senses.

A. Feeling Time - Sit in a small circle in your wild place. Put on your blindfold. Your teacher will find things to pass around, one at a time. Feel them with your hand, and say one thing about it, and also decide if it is dead or alive. Listen to each student's description. After everything has been passed around, take off blindfolds and look at the things.

How many were dead or living things?
Who had the best descriptions? The funniest?
The most creative? The most imaginative?

B. Listening Time - At this spot, everyone must be very quiet as they sit in a circle again with blindfolds on. Listen for 5-10 minutes to the sounds of wind, and bushes, and trees; of animals and birds; of insects or bugs; and other sounds. (If you have a tape recorder--try to capture these sounds.) What sounds are coming from living things?, from dead things?; can you tell what is making these sounds? Use words to describe the sounds you hear. Have each student share this information on any sound with the others.

C. Smelling Time - At this station, again with blindfolds on, smell things that are passed around by your teacher. Each student, in turn, describes the smell and labels it as coming from a dead or alive thing. When all things have been passed around, remove blindfolds and look at the things. How many came from dead things?, from live things? Who had the best description.

D. Tasting Time - NOTE--TASTE ONLY SAFE THINGS--grass, pine needle, maple leaf, etc. Again, use blindfolds, and tell what each thing seems to be. Is it dead or alive? When everyone has finished, take off blindfolds and see how you did!

E. Looking Time - At this location, look around and try to describe your wild place as other students listen. Try to be imaginative and accurate. Pick out one special thing that you like the most about your wild place. Tell about it to the others; tell whether it is living or dead. What makes it a living or dead thing?

At this wild place, find something to make a crayon rubbing. Place the paper you have over the thing and, using a crayon, rub over the surface to make an impression. Was your thing living?, dead? Take this back to school and make a display for others to see!

F. Thinking Time - Here, you stop to sit quietly for awhile and think about your wild place. Ask yourself:

1. Is it good to be here?

2. How do you feel about yourself today?

3. Would you like to come back?

4. Would you like to be an animal in this place?, or a plant?

5. Would you want someone to change this place?
6. How would you feel if there was junk here?
7. How would you keep this place nice?

If there is time left, you may just wish to sit and chat, play a game, act out some characters or animals, or anything else you can think of. And when you are finished, give your teacher a great big cheer for bringing you here!

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Environmental Field Activity: Little Things I Know

Recommended Grades: K-2

Author(s): Sister Rosella

Mrs. Carol Kolstad

St. Boniface, DePere

Concepts:	Integrated with:
1. Sun energy	Social Studies
2. Ecosystem	Science
6. Natural resources	Language Arts
	Art and Music

Objective(s):

Primary students will recognize things in nature by checking, coloring, or collecting things appropriate to a set of picture or activity boxes on a worksheet.

Rationale:

If youngsters can begin to recognize early things in nature, they may grow up to be more aware of, find beauty in, and appreciation for things around them. Give them freedom to color and collect as befits their perception of things--and be imaginative in your own perception of what they do. So what if a rabbit is purple--wouldn't it be nice if there were purple rabbits?

Directions:

1. Provide each student with the activity sheets, something firm to draw on, and have them take along a box of colors.

2. Several children could be "glue people" with a small container of Elmer's glue to be available to children when they need to collect soil samples or some smelly thing.

Activity:

1. On arrival at the site, have students do the "What's the Weather Like" page. Explain that they should color the pictures that they think best describe what the weather is like, using a color that is best for the pictures they choose.

2. Take a walk with the class, starting at the fire circle, past the main building down to the pond, through the woods to the meadow. In the meadow area, sit down and ask the children to check the things they saw and color them. When starting the walk, ask children to look around carefully and to remember what they saw.

3. Have the children find four (4) different leaves in the woods at the edge of the meadow. (A set of four for each team of 4-5 students.) Pass them around, and have each one trace all four on the worksheet and color them.

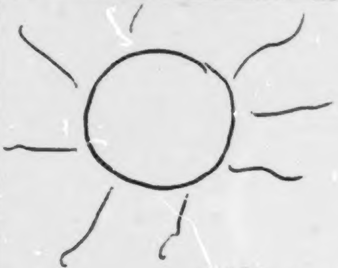
4. In the meadow area, what other things can they find. Do not pick, just have them check the correct boxes on worksheet 4. In a group, have students share the different things they saw.

5. This is the glue sheet - children should find something that smells and glue a small piece of it in the spot marked for it. On the other spot, they should spread some glue on a small area and sprinkle some soil, trying to find some different kinds around the meadow area. You can talk about why there are different kinds.

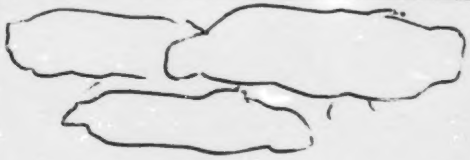
6. If you had a good day - the better worksheets (or all of them) could make a nice bulletin board display back in school.

WORKSHEET 1

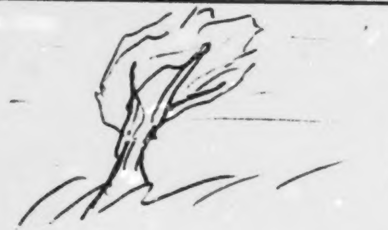
WHAT'S THE WEATHER LIKE?



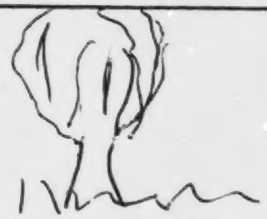
☐ sunny?



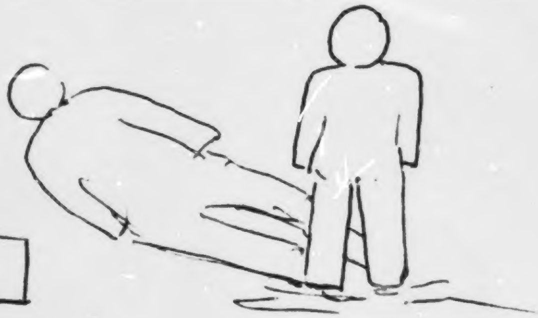
☐ cloudy?



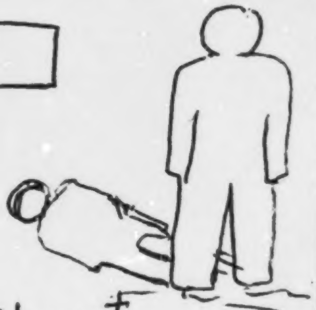
☐ windy?



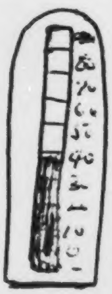
☐ not windy?



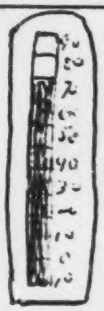
☐ Long shadows?



☐ short shadows?



☐ cold?

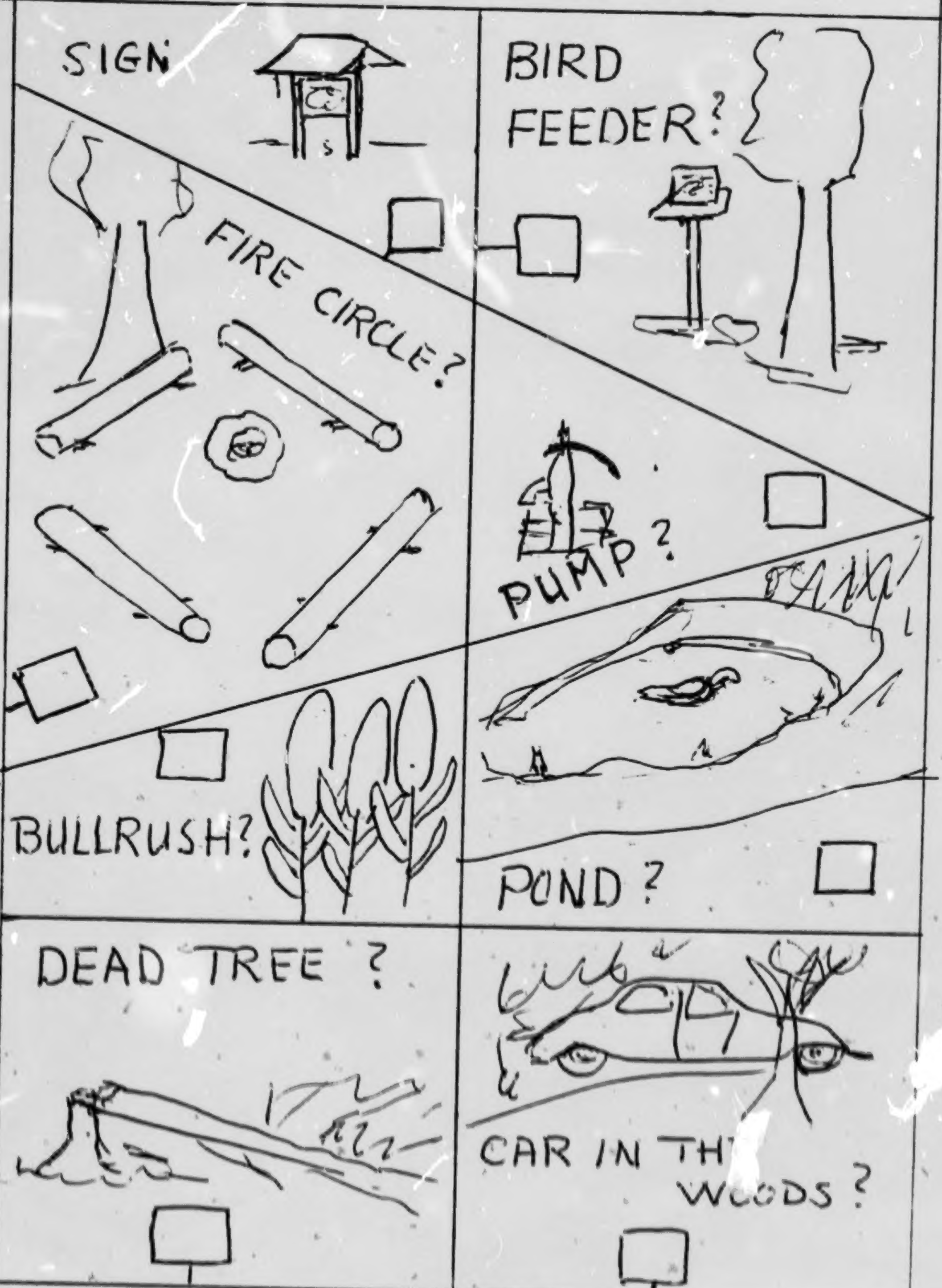


☐ warm?

PUT A CHECK (X) IN THE BOX AND
COLOR US IF YOU LIKE!

WORKSHEET 2

SOME THINGS I SAW...


SIGN ☐
BIRD FEEDER? ☐
FIRE CIRCLE? ☐
PUMP? ☐
BULLRUSH? ☐
POND? ☐
DEAD TREE? ☐
CAR IN TH WOODS? ☐

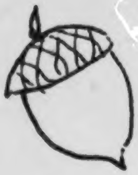
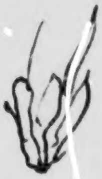
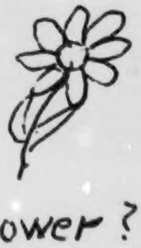
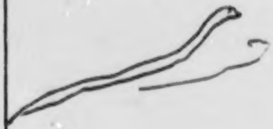
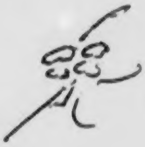
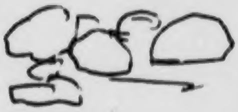
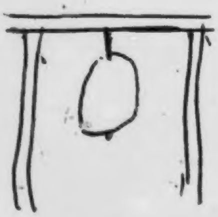
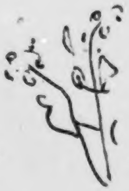
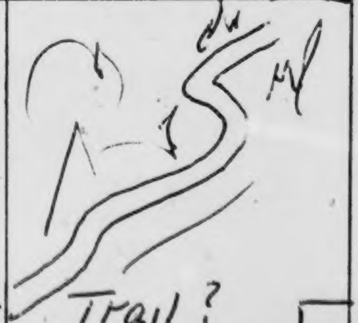
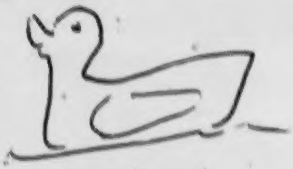
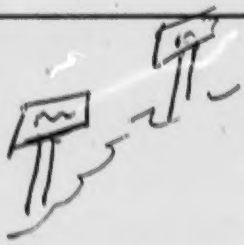
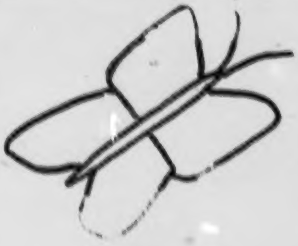
IF YOU SAW US — COLOR US LIKE WE ARE —

WORKSHEET 3 **LEAVES**

1.	2.
3.	4.

IN THE MEADOW

WORKSHEET 4 OTHER THINGS ?

 Acorn ? ☐	 weeds ? ☐	 FLower ? ☐
 worm ? ☐	 seeds ? ☐	 stones ? ☐
 Bell ? ☐	 Berries ? ☐	 Trail ? ☐
 Duck ? ☐	 Signs ? ☐	 Butterfly ? ☐

Check the box (X) if you SEE
these things in the MEADOW

WORKSHEET 5

GLUE ME ON TIGHT —

How do I smell?

The ground and Me?

Place some glue on the paper and sprinkle some ground on it - what kinds are there?

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Reprint:
Project I-C-E RMC
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Green Bay, Wisconsin 54301

Environmental Field Activity: Be a Frog, a Bird, or a Tree

Recommended Grades: Seasons: K-6 Fall/Spring

Author(s): Margaret Hoogland

Westwood, W. DePere

Concepts:
5. Air
8. Attitudes and Values

Integrated with:
Physical Education
Health
Language Arts

Objectives:

Students will apply basic yoga positions to mimic various natural elements, develop ability to concentrate via meditation, and be involved in activities reflecting appreciation of nature and natural things.

Rationale/Directions:

To turn mind and body onto things in nature is not an easy task. The hurried life style and failure "to see the tree for the forest" are commonplace. This activity series causes one to stop, to look, to listen, to imitate, to reflect--and in so doing, it might just trigger a response and a positive consideration of man's relation to nature.

Activities:

Students in class and at a natural area outing may be directed to perform and participate in any number of the following activities as time and circumstances permit.

1. Teacher (and students if possible) read Yoga for Young People by Kiss.
2. Introduce and practice basic yoga positions in class. Use "I Can Be a Frog, a Bird, or a Tree" by Rachel Carr as a text.
3. Go to Fallen Timbers for meditative hike on nature trail.
4. Go to campfire circle in front of cabin. Sit quietly on log chairs. Breathe deeply. Concentrate on breathing with mouth closed. Stand. Pause.
5. In front of cabin do "the wood chopper" position also "bow and wheel" and "wheelbarrow" positions; several times.
6. Proceed to pond area. Once there, do "the fish", "the bridge", "the tortoise" and "the swan".

7. Walk slowly, breathing through the nose only--to the "meadow area". In the meadow do "the corpse" position and "the grasshopper". Hike briskly now to the cedar swamp area. [illegible] "the tree" position, "the stork", "the bird" and "the frog".

8. Proceed to the "maturing aspen area". Sit in "the lotus" position for a few moments. Then do the breathing, eye and neck exercises. For meditation, have one student read aloud from any favorite poetry book. Suggestions: We've tried "Don't Tell the Scare Crow" by Issa (haiku poetry) and "The Wind and the Rain" by Lewis.

9. Make your way back to campfire circle area for a natural food party or lunch break. Suggested healthful natural foods:

apples
oranges
raisins
dates
any dried fruit

grapes
bananas
figs
prunes

nuts of any kind
peanuts
sunflower seeds
popcorn

pretzels
triscuits
wheat thins
graham crackers

cheeses - sliced, spread, curds, etc.

carrot sticks w/peanut butter
celery sticks stuffed with cheese, raisins, nuts, etc.
pickles (fresh cucumber slices)
olives
green pepper, sliced
cauliflowerlets
deviled eggs
party mix

breads - homemade
orange juice
fruit juices (in returnable bottles or a thermos only)
cocoa

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Reprint:
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Green Bay, Wisconsin 54301

Title: Short Stuff

Recommended Grades: Seasons: K-12 All seasons

Author: Suzanne Simon

Adapted from "Acclimatizing" by Steve Van Matre

Concepts:
1. Energy
2. Ecosystem
4. Water
3. Carrying capacity
6. Natural resources
8. Values and attitudes
12. Stewardship

Integrated with:
All subjects

Objective:

(Vary with activities, which are designed to acclimate student to aquatic consciousness of the environment about him.)

Rationale:

In our rush to learn a lot of facts about the natural world we tend to forget the role of contemplation and our senses in giving us information. The following activities get the students actively involved in learning about their environment. They are meant to increase the student's awareness and appreciation of the world around him. The reason for developing awareness and appreciation is based on the feeling that if a person cares strongly about something he will be more likely to exercise stewardship over the object of his affection.

Directions:

Each of the following exercises are autonomous. They are not meant to be done one after another. Rather pick out those that appeal to you and include in your field day. Some of the activities are more involved than others and will take more planning on your part. Check each activity for equipment that you will need. Many of the activities are written so you can add your own imaginative variations. Feel free to make any changes or additions.

Other ideas can be found in Steve Van Matre's Acclimatization and Acclimatizing.

One-of-a-Kind

(from Acclimatizing, page 66)

"Each person is given (or finds for himself) a particular kind of leaf. Tell them to examine it so carefully that they would be able to pick it out of a whole pile of such leaves. (Or leave this last part as a surprise for later.) During the next five minutes, they look at it, feel it, hold it at different angles, etc. Then put all the leaves together--with some identical leaves that no one has explored--and have them find theirs. It's one of a kind! Afterwards, have them explain to the group (or to the person sitting next to them) what makes their leaf unique. Then ask them to share what makes them unique." (material in parentheses the authors) Total time about 15 minutes.

Getting to Know a Tree

(from Acclimatizing, page 69)

"Put on blindfolds to heighten other senses. After a short spin (just like in pin-the-tail-on-the-donkey) to erase the sense of direction, guide each participant to a tree. Any tree. Ask him to explore it. Hug it. Rub his cheek against it. Listen to it--try to hear the life inside it, the sap running, the life breathing within. Explore its "skin" with tongue, fingers, nose, his own skin. Check out its base--where it grows. Is anything living on it? After each gets to know his tree, lead them away again. Then, take the blindfolds off, return to the general area, and let each camper try to find "his" tree. They probably will. Some make a beeline for it right away, some scratch their heads and run a gamut of tests--size, shape, texture, moss on the trunk--but they always end by patting the trunk and affirming" "THIS IS MINE!"

This exercise is easily done in pairs, with one person guiding and other blindfolded. They switch roles after finding the tree.

Both exercises emphasize the individual within a population.

On the Street Where you Live

Divide the group into teams (of about 4). Send the groups to different areas. Have them mark off a small area (about 10 feet square). These are the 'neighborhoods'. Have them label the different parts of the neighborhood, i.e., grocery stores (include for what kind of animal) homes, sewage treatment plants, water source, etc. Have the different groups share their community with other groups. Emphasize - that nothing lives alone and that living things must live in specific areas.

For other ideas concerning communities, see "A Dairy Lesson Plan", p. 25-71 and "Quadrant Task Force", p. 81 in Acclimatization.

Interviews

Have one student pick a specific animal. The rest of the students then ask questions pertaining to the life of that animal. Ask: Where do you live?, what is your favorite food?, do you like to be near people? Spend about 5-10 minutes on each animal. It's a good review for animal classification.

Staging

Staging is an exercise on succession. Choose an area ongoing active succession. Stretch a string from a point with little or no plants growing to a point showing a successional end or climax. In groups of four, place the class along the string. Each group should mark off a stage (about 5 feet square). One edge of the stage should be the string. Each person in the group should have a title. The stage manager describes the stage (the environment). The prop man describes the props (the inorganic and dead part), the actors to describe who is in the play (the living portion), and the playwright to describe the plot (what is happening).

The class should move from one stage to another with each group briefly describing their area.

To help conserve time, have the students organized into groups and the groups assigned to an area along the string prior to the exercise.

A Part of the Sun

Have the class slowly open and close their fists. Tell them to concentrate completely on that simple exercise. Do it over and over. Ask them what gives them the power to open and close their fists. They will probably say their bones and muscles, or food. Keep going back until they reach the idea that the sun gives us energy. Emphasize: That we all are really pieces of the sun.

This is also a good time to bring in the concept of spaceship earth. See the write-up 'The Sun' in Acclimatizing, page 78.

Budding

(from Acclimatizing, page 67)

"This is an exercise that is particularly good in the early morning. Sit in a circle. Then turn the circle around so everyone is facing OUT, rather than in. Now, become like the bud of a flower or a tree. Start by pulling in knees and arms and hunching over, all curled up into a tight ball. Slowly, slowly open to the sunshine. Gradually unfold. Shake your head and loosen your shoulders. Reach out.

Or be buried in a pile of leaves to become a mushroom. First one finger on each hand pokes up through the layer, then one more finger at a time until the whole hand pops up. Then the arms spring up; a head pokes through. Finally, like a mushroom on a warm day after the rain, come bursting out from the earth! Explode!"

Raintree

(from Acclimatizing, page 92)

"Need a good rainy day activity? Don't hole up in your tents. Get everyone in a poncho and head for the edge of the marsh. You can all become trees soaking in the rain! Take OFF your hoods, hold your bare arms OUTSIDE your poncho, and root your sneakers to the ground! Let the rain wash over your face like the rivulets on leaves, let the wind push you to and fro like the swaying trunks of the trees. After a few minutes, you'll actually be able to see through the water in your eyes, your arms will sag like rain-drenched boughs, and your feet will grip the earth against the gusts of wind blowing across the open spaces. It's an exhilerating experience; a role-playing idea that will place you in direct contact with the elements."

E.P.'s

(from Acclimatizing, page 91

This is a public interview based on an environmental problem. The leader initiates the interaction by announcing "I am a man-made environmental problem (e.p.) on this site. I affect each one of you, what am I?" After the problem is identified, the real task is to trace the problem to each of the participants. Discuss how the problem affects the student, and how the student affects the problem.

Changes

Talk about changes which have occurred in a specific area. In pairs, have the students express their feelings about the changes in relation to man and in relation to the world in general. Have them talk about what could happen to the area in the future.

Have the students express their feelings about man and the web of life in haiku, a story, a picture. The students could keep a personal journal about their experiences and feelings.

Natural Observation Spots

(from Acclimatizing, page 66)

"These are places where you can station persons to observe the action. Find spots near special animal homes--a bird's nest, an ant hill, near a muskrat lodge or bee's hive, or close to the home of a squirrel or chipmunk. Just watch. See what the animal does. Follow it. (Instruct everyone to leave an offering behind near their animal's home--like a special stick, a crumb of food, or a plaything!)"

Whogetzit

Organize the class into three groups. The first group are ground dwellers, they move around on their stomachs. The second group navigates on hands and knees (tape fists shut). The third group stands, but have their hands tied behind their backs. Place pieces of candy, peanuts or 'other food' at different heights around the area.

Talk about advantages and disadvantages of being different heights or shapes.

Camouflage

(from Acclimatizing, page 92)

"Scatter dozens of colored toothpicks (equal numbers of red, yellow, green, brown) over a separate area of the ground ahead of time. Prepare for the action by explaining to the campers that camouflage plays an important role in adaptation (everything grows to fit where and how it lives). Many plants and animals have adapted to the place where they live in the protective coloration which helps hide them from predators. Then lead the group to their "hunting grounds" where everyone collects as many toothpicks as possible in one minute. Sort the toothpicks collected into colored piles and tally how many of each color were retrieved. The results set the stage for a discussion of adaptative traits (both form and color), and hopefully raise questions about the effect such patterns play upon our perception. (Another line of discussion can deal with plants and animals which use colors to attract or distract others. Don't forget to include man!)"

The Opposible Digit - The Key to Success

As the students enter the classroom, securely tape their thumbs to their hands. Run a 'normal' class in this fashion. (You could tape your own thumbs, too.) If the class is receptive, have them keep one hand taped the rest of the day; unless it is not safe to do so--i.e. an industrial arts class.

Blindfold each students (keep their hands taped). Tell them they're raccoons out at night hunting. Raccoons hunt with their hands, you're they're prey so they then scatter peanuts on the ground, have the students find them, open them and eat them like a raccoon. A variation of this is to start out with the raccoons paired. The 'home' raccoon who isn't blindfolded and the 'visiting' raccoon who is. The 'home' raccoon shows the visiting raccoon all the interesting parts of his home by having the other raccoon touch and feel things. After about 10 minutes, switch.

Changing Perspectives

Position about six students in different spots around a tree. You could have them in the tree, looking up at the branches, lying down and looking up, right next to tree looking at a small square of bark, in the distance looking at the tree, looking at it through their legs, or upside down. Any way at all is alright as long as they have a different perspective on the tree. Have each student say two adjectives which describe the tree from his perspective. Assign six other students (or the rest of the group) to put the list of adjectives into a poem. They cannot use any other words except a, an, the, or other very simple word. Other students could draw a picture of the tree or do some other short acclimatization activity.

Environmental Activities Training Project
Fallen Timbers Consortium Schools
1927 Main Street, Green Bay, WI 54301

Reprint:
Project I-C-E RMC
1927 Main Street
Green Bay, Wisconsin 54301

Title: Visit to a Wild Place

Recommended Grades: Seasons: 1-2 Spring

Author: Sister Rosella
Carol Kolstad
St. Boniface, DePere

Concept(s):	Disciplines:
2. Ecosystem	Science
12. Stewardship	Social Studies
	Art

Objective(s):

Children will observe in various ways a variety of natural things in their "visit to a wild place" and record same on the various sheets that are a part of this activity.

Rationale/Directions:

First and second graders have the imagination to make Fallen Timbers still seem like a real wild place. With that motivation and the descriptions given for all activities, they can have a fun experience that results in learning to see all kinds of things about them.

STUDENT WORKSHEET

1. Circle what kind of day it is:

SUNNY
CLOUDY

HOT
COOL
COLD

WINDY
NOT WINDY

QUIET
NOISY

FALL
WINTER
SPRING

OTHER:
____
____

2. Where would you expect to find wildflowers?

__________ In meadows
__________ In gardens
__________ In the forest
__________ In flower boxes

__________ In greenhouses
__________ Along rivers
__________ Along city streets
__________ Along country roads

Take a walk through the forest and look for wildflowers. Do not pick any; leave them for others to see. Check the ones you see. Name its colors, too.

	Flower	Color
_____	DAISY	____________________
_____	VIOLOT	____________________
_____	TRILLIUM	____________________
_____	BUTTERCUP	____________________
_____	MAYFLOWER	____________________
_____	WILD STRAWBERRIES	____________________
_____	WILD ROSES	____________________
_____	DANDELION	____________________
OTHER		
_____	______________	____________________
_____	______________	____________________
_____	______________	____________________

Which flower is our state flower? ______________________

If you saw this flower, draw a picture of it in the box.

3. The forest looks different when you look up than when you look down. Check off those things you see when you look upwards or downwards.

	UP	DOWN		UP	DOWN
Clouds			Thorny bushes		
Water			Butterflies		
Paths			Seeds of trees		
Stores			Fungi or mushrooms		
Signs			Pussywillows		
Sun			Ants		
Birds			Caterpillars		
Bird nest			Logs		
Insects			Worms		
Spiders			Grass		
Shadows			Cattails		
Animal tracks			Deer path		
Flowers			Fire circle		
Vines			Bird house		
Buds					

4. Many birds make their home at Fallen Timbers. Check any birds you saw.

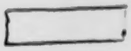
_______ ROBIN
_______ SPARROW
_______ REDWINGED BLACKBIRD
_______ GOLDFINCH
_______ BLUEJAY
_______ KILLDEER
_______ MEADOWLARK
_______ CROW
_______ ORIOLE
_______ SWALLOW
_______ WOODPECKER
_______ DUCK
_______ OTHER _______________
_______ OTHER _______________

5. Go out and gather stones which fit the following shapes, sizes and textures:

ROUND

OVAL

SQUARE


RECTANGLE

CONE

ROUGH SMOOTH SHARP

BIG THIN SHORT WIDE

LITTLE THICK LONG

6. Sit in a circle with your stones in front of you. Look at everyone's stones and choose the best one for each shape, size or texture. Glue that stone on a piece of cardboard with the shapes printed below the stone.

7. Lay down in the grass in a circle with your heads toward the center. Close your eyes and listen. Tell what you heard. Go around the circle and one at a time tell how you feel and what you liked best about the field trip. Name one thing you could do to help preserve wild areas.

8. Think about what it would be like to be an animal in the woods. Everyone pretend you're an animal. Act like that animal.

Environmental Activities Training Project
Fallen Timbers Consortium Schools
1927 Main Street, Green Bay, WI 54301

Reprint:
Project I-C-E RMC
1927 Main Street
Green Bay, Wisconsin 54301

Title: Things The Eyes Don't See

Recommended Grades: 1-2 Seasons: Fall, Spring

Author: Catherine Krahn

Seymour

Concept(s):
1. Energy
2. Ecosystem
4. Water

Integrated with:
- Science
- Social Studies
- Language Arts
- Art

Objective(s):

The students, in groups, will collect samples of soil, water, damaged leaves and rotten wood. With the use of microscopes and magnifying glasses, the students will identify and discuss objects which they could not see without mechanical aids. An adult will record the observations.

Rationale:

Even at an early age, children may learn to use a microscope to make some broad observations of life in seemingly dead or other situations. By following the directions, and with the help of older or adult leaders, such observations can be recorded and, later, drawn adding excitement and understanding to a study of the natural world.

Directions:

At school talk about things which can be present even though we can't see them. Have the students make a list of items which they can't see. Ask the students how we know they're really there. Explain to them what a microscope and magnifying glass is. If possible borrow a microscope from an older grade and have the students practice looking at hair, coins, pencils, etc.

Arrange for parent team leaders for each six children. Divide the class into three groups, each group will be collecting something different.

Group 1. With the use of an aquatic net, collect a sample of water from a) the pond b) a small puddle (if available).

Group 2. Using hand trowels collect soil samples including the top litter from a) the forest b) the field.

Group 3. Gather leaves which have been damaged, eaten, shriveled with bright eyes, budges, etc. Also gather pieces of bark or rotten wood.

Have the groups return to the cabin where the microscopes have been set up. The parents or teachers should set up the materials under the microscopes for the children to look at. Using a tape recorder or keeping track on paper, record the observations of the children. Have the children tell what they see that they couldn't see before, include colors, shapes, living things, etc.

Make up a story about the life of the critters seen under the microscope. Start the story and then point to a child and have them pick up the story. Go around the room until everyone has added to the story. Try to get the students to think about what the little critters are doing, what they eat, who eats them. For example, an insect in a tree stump is helping turn the wood into soil and is food for a hungry woodpecker. This story can be done at school or in a circle outside at Fallen Timbers.

Back at school have each child draw a picture of something they saw under the microscope. Display the pictures under a picture or drawing of the material they were found on.

OBSERVATION RECORD

Samples Collected	Things I Saw With a Microscope
Soil	1. ________
	2. ________
	3. ________
	4. ________
	5. ________
Water	1. ________
	2. ________
	3. ________
	4. ________
	5. ________
Rotting Wood	1. ________
	2. ________
	3. ________
	4. ________
	5. ________
Rotting Leaves	1. ________
	2. ________
	3. ________
	4. ________
	5. ________

Environmental Activities Training Project
Fallen Timbers Consortium Schools
1927 Main Street, Green Bay, WI 54301

Reprint:
Project I-C-E RMC
1927 Main Street
Green Bay, Wisconsin 54301

Title: Guess Who

Recommended Grades: 1-2

Seasons: Fall, Spring

Author: Catherine Krahn

Seymour

Concepts:

2. Ecosystem

Disciplines:

Science
Social Studies
Art

Objectives:

The students will explore and find various animal homes and record their findings by drawing pictures of the home and of the animal who lives there.

Rationale:

Every living thing needs a place to live whether it be a man, a bird or a mouse. By looking for animal homes and talking about the needs of those animals the students will acquire a deeper appreciation of human needs as well as an understanding of the complexity and diversity within the animal kingdom.

Directions:

Each child should have a worksheet and a piece of cardboard or clipboard to write on.

At school, prior to the field trip talk about animal and people homes. Have students cut out pictures of homes and make a collage. Example of pictures could be: water-fish, small holes-worms, forest-deer, nest-bird, brush pile-rabbits, cracks-small bugs. Talk about animals, such as insects and birds which the students might see and animals such as mice, rabbits and deer which they probably won't see.

Divide the class into small groups of about 5 or 6. Have one parent for each group. The parents should carry the crayons until the students are ready to color. Instruct the children to look carefully for animal homes. When they find one they like they should stop and carefully draw it and in the square next to the home they should draw the owner of the house. The parent leader will have to stop the group in a general area for this so nobody gets left behind. You could also make up colored toothpicks with a paper flag on it. Each home could be marked with a flag. Try to pick up all flags when done. At the end of the activity ask the following questions.

1. Why do animals or people need homes?
2. What signs are animal homes? Why?
3. How can you figure out which animals live in a home?

GUESS WHO
Student Worksheet

Draw My Room	Who Am I - Try to Draw Me
1A	1B
2A	2B
3A	3B

Environmental Activities Training Project
Fallen Timbers Consortium Schools
1927 Main Street, Green Bay, WI 54301

Reprint:
Project I-C-E RMC
1927 Main Street
Green Bay, Wisconsin 54301

Title: What Are Your Values

Recommended Grades: Seasons: 1-3 All

Author:

St. Paul's, Wrightstown

Concept(s):
8. Values and Attitudes
12. Stewardship

Disciplines:
Social Studies
Science
Art
English

Objective(s):

Through the questions posed and the responses recorded, students will examine values they have, consider what influence their values have on things they perceive for the purpose of developing a value-oriented consciousness.

Rationale/Directions:

This activity works very nice if you can pair up two first or second graders with a third grader. The third grader does the writing for the team and composes the poem. The first and second graders find the objects, talk about the questions and help make the collage. If you are working with just first or second graders, the adult will have to do the writing for the children. Third graders can do all the activities themselves.

Start the activity by discussing the first set of questions. Since this is a valuing activity, no answer is wrong. Record the answers either on paper or with a tape recorder. When you get back to school some of the answers could be put on a separate collage next to the nature collages. Then divide the students into teams of three or work as an entire group. Each team should have a worksheet and a sturdy piece of paper for the poem and collage.

Group Discussion Questions:

1. What are values?
2. Do you have values?
3. How do you know you have values?
4. Do values change?
5. In what ways do you behave differently from last year?
6. Do you think people should have the same values as you do? Why?
7. What six things do you value most? least?
8. What do people in your community value most?
9. What do people in your community value least?

What Are Your Values

Student Worksheet

1. Everyone in the group should find something they feel is ugly and something they feel is beautiful. As a team, answer the questions the third grader or the adult will write down the team's answers.

   A. What do you think is beautiful? Why?

   B. Do your values affect its beauty? In what ways?

   C. What do you think is ugly? Why?

   D. Do your values affect its ugliness? In what ways?

   E. If your values changed, would it change its ugliness or beauty?

2. The third graders should write a cinquain (poem). First or second graders will collect natural objects to go along with the poem. The poem can be about any object at Fallen Timbers.

   An example of a conquain is:

BUG	1 word to name an object
SMALL BROWN	2 words to describe the object
CRAWLS, EATS, MOVES	3 words to tell what the object does
SCARED WHEN ON ME	4 words to describe how you feel about it
INSECT	1 word which to you means the same as the first word

Work on your poem in the space below. When you have it finished to your satisfaction, rewrite it on a clean piece of paper your teacher will give you.

3. Glue natural objects collected from your area around the poem to make a collage. Try to find objects which in some way go with the poem.

Reprint:
Project I-C-E RMC
1927 Main Street
Green Bay, Wisconsin 54301

Environmental Activities Training Project
Fallen Timbers Consortium Schools
1927 Main Street, Green Bay, WI 54301

Title: The Fox and the Hunter

Recommended Grades: Seasons: 1-12 Spring-Fall

Author: James Kloes

Little Chute Middle School

Disciplines:
Physical Education
Science

Concepts:
2. Ecosystem
3. Carrying Capacity
9. Change

Objectives:

While playing a game as part of physical education, students will also consider the implications of prey-predator relationships in the natural world as demonstrated by responses to the questions posed.

Directions:

Set up the area by placing eight "dens" in an area that is 40 x 60 feet. Mark the boundaries of the area. This can be made larger or smaller depending on the age of the students. The dens are red sheets of paper 11 x 14. One student is the hunter, the rest are foxes. Each fox is safe when in a den. On a whistle, the fox must move to a new den. When the fox moves, the hunter tries to hit the foxes with the dodge ball. When hit, either have the fox become another hunter or sit out. The foxes can use any natural material within the area as camouflage. Play the game several times so different children can be the hunter. Spend some time at the end having the students answer the question sheet and discussing their answers.

THE FOX AND THE HUNTER
Student Answer Sheet

1. Was it easier to hit a fox at the beginning or end of the game? Why?

2. The fox is a predator just like a hunter.

   a. What would happen to the fox's prey if there were too many foxes killed?

   b. What would happen to the fox's prey of there was no hunting of foxes?

3. Carrying capacity means the ability of an area to keep a certain number of animals of one kind alive. How does hunting affect the carrying capacity of an area?

Environmental Activities Training Project
Fallen Timbers Consortium Schools
1927 Main Street, Green Bay, WI 54301

Reprint:
Project I-C-E RMC
1927 Main Street
Green Bay, Wisconsin 54301

Environmental Field Activity: The Bur and the Beast

Recommended Grades: Seasons: 2-4 Fall

Author(s): Linda Riebe

Notre Dame, DePere

Concept(s):
2. Ecosystem
3. Carrying capacity

Integrated with:
Science
Social Studies
Language Arts
Art

Objective(s):

Through the experience, students will demonstrate how they become carriers for dispersing seed burs, understanding then that in a natural area, animals perform the same function.

Rationale:

Nature has a way of getting things done. Some plants have burs, containing their seed, and depend on a carrier to spread that seed for reproduction. They, in other words, are dependent on something or somebody else in order to sustain the species. Can you see a relationship between this and people being dependent on others? Think about it.

Pre-Trip Activity:

Show and discuss filmstrips: "How Do Plants Get Where They Grow?", Whys of Elem. Science
"How Seeds Travel", Film of the Month Club

Discussion of:

Description and function of burs
Distribution role of animals, birds, people, wind
Kinds of fabrics to which burs stick well
Soil in which burs take root and grow

Directions:

Students are grouped into teams of 4-5; team leader. Each team should have the following:

1. A plastic or paper bag
2. A hand lens
3. A small container for soil
4. A large piece of white paper (20" x 30" or so)
5. Each member of team might have the same type of clothing fabric (optional--to see which attracts the most burs)

Activity:

In pre-designated areas, student teams should:

1. Walk, arm's length apart, in a circular path through the given area. (5-10 minutes)

2. At some appropriate spot, team members can crawl, lay, roll, run, walk. (5-10 minutes)

3. Team members, individually or helping each other, pick off burs from their clothing and place in bag.

4. Each team obtains soil for the container from their general area.

5. Summary activity:

   a) How many burs were collected by the team? ________________

   b) How many different kinds were there? ________________

   c) How many of each kind, can you identify?

	What Kind?	Number
1)		
2)		
3)		
4)		

Post-Trip Activities:

1. Each team may prepare tagboard display by gluing on different species and describing them.

2. Planting burs:

   a) Refrigerate for two weeks; then

      1) Place gravel in bottom of container and add soil collected previously.

      2) Plant burs.

      3) Water lightly occasionally.

      4) When burs sprout, place in sunlight.

      5) Record germination time, and growth.

   b) Plant some burs as above, but do not refrigerate beforehand.

   c) Compare results of the experiments.

3. Review in class why some plants have burs and compare to other natural or human ways and needs.

Environmental Activities Training Project
Fallen Timbers Consortium Schools
1927 Main Street, Green Bay, WI 54301

Reprint:
Project I-C-E RMC
1927 Main Street
Green Bay, Wisconsin 54301

Title: The Webspinners

Recommended Grades: Seasons: 2-5 Fall, Spring

Author: Suzanne Simon

Concepts:
1. Energy
4. Water
5. Air
2. Ecosystem
9. Change
12. Stewardship

Integrated with:
Science
Social Studies

Objectives:

By participating in the sequence of activities suggested, students will visually demonstrate how numerous elements are interconnected in an ecosystem.

Rationale:

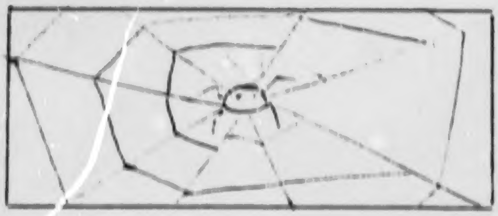
We hear how everything in nature is connected to everything else; that disturbing one element in a natural system disturbs everything else. Youngsters can visualize this more quickly when it is demonstrated by a group, role playing, in this case, the spider, whose web can be utilized to show connections. And it can be fun learning!

Directions:

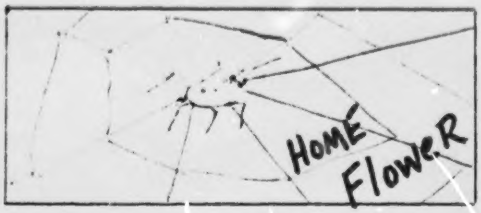
1. Organize the activity in a large field, preferably one with goldenrod flowers. It's very important to set the stage for the activity and to keep the discussion moving. Have the students pretend they're spiders. Ask them what are the most important things in the life of a spider. Since they're spiders they can shoot out a web. As they mention different needs they should send an imaginary web to that need. They can do this either 'spiderman' style with their hands or you can have them hold their hand in the proximity of the rear end, snap their fingers and make a whooshing sound. Keep sending out webs. Talk about how big their imaginary web is becoming.

2. Have the students look for spiders on the goldenrod flowers. Have the students watch a spider or several spiders. When they come back have them share what they saw. Talk about the spider's activity, colors and shapes.

3. a. Ask for one student to be the spider. Give him a tag which says 'spider' on it. (The cards are available at the center.) The cards look like this:

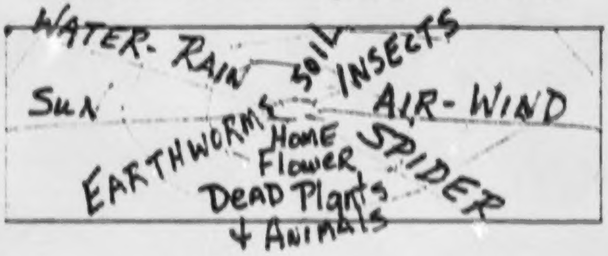


b. On the card the 'spider' should write one thing he needs to live. This should be a basic need such as a home, food or water. Below that he should write one item which fulfills his need. For example after home he might put flower.



c. He then gives that card to another person in the group. That person becomes the object which fulfills the need, in this case a flower. Tie the student to the spider with a long rope.

d. The 'flower' should then write on the card all the things it needs to live. The filled out card may look like this:



e. The spider should continue to fill out cards with things he needs to live. If he runs out of ideas ask the remaining children to help. Continue until all the students are tied to the spider or until no more needs can be thought of. The students should look like a maypole with the spider as the center.

f. Take the card of the flower or first need chosen. Read the card out loud. Run a piece of rope from the flower to any need which was the same as the spider. If the flower needed something the spider didn't run a new string out and use any extra students. If all the students are already part of the web run a string out to a special stake.

g. Continue around the web until everyone is attached to their "needs". The web should be pretty complex.

h. Take away one of the "needs" (either have them sit down or completely remove them from the web). Talk about what happens to the web. Remove another "need" and another. What happens to the spider? What happens to everything else? Emphasize--Everything is connected to everything else and we need everything.

i. Talk about making another web of animals which need a spider (birds, reptiles, amphibians and insects). Ask about other webs, how would they be the same? How would they be different?

j. Have the students write a short story or paragraph about man's role in the web of life. Talk about their ideas.

Environmental Activities Training Project
Fallen Timbers Consortium Schools
1927 Main Street, Green Bay, WI 54301

Reprint:
Project I-C-E RMC
1927 Main Street
Green Bay, Wisconsin 54301

Title: Measure Your World

Recommended Grades: Seasons: 3-4 All

Author: Nancy Hinzman

Sr. Gerri Kryshak

St. John's, Little Chute

Concept(s):
2. Ecosystem

Integrated with:
Math
Science
Art

Objective(s):

Students will apply measuring skills in mathematics in the activities outlined and make some observations requiring language and art skills using a natural setting, with such information properly recorded in the spaces provided for each.

Directions:

Make sure you have all the equipment needed for each activity before starting. Have the students work individually except where two people are needed to use a tape measure. Each student should have a ruler, meter stick or tape measure. You may have to split the group and have half working on Activity #1 and half on Activity #2. It's also possible to divide into thirds with one group working on each of the first three activities. Before leaving on Activity #4 check and record the time, do not let the students know that you are doing this.

For Activity #4 divide the group into seven teams. Each team measures a log. Then either rotate and measure a new log or have each group report on their own log. Do Activity #5 in an opening in the woods or in the field. Make sure you have all the numbers in a bag before you leave. Activity #6 can be done anywhere. The students may want to go back to find an object to draw or they may want to go to a particular scene, tree or area to draw their picture. When they finish Activity #6 ask them to guess the length of time from the start of Activity #4 to the present. Tell them to correct time. Check to see who was the closest.

Measure Your World

Student Worksheet Name ____________________

1. Use a ruler or tape measure to measure the following in both inches and centimeters.

Object	Inches	Centimeters
A stick		
Your shadow		
Three different leaves 1.		
2.		
3.		
Height of two plants 1.		
2.		
Shadow of a tree		
Distance between two trees		
Two things you'd like to measure 1.		
2.		

2. Walk from the building to the pond. Count your steps. How many did you take? ________.

Measure the length of your step. ________

Ask three friends how many steps they took. Write down their names and number of footsteps in the box.

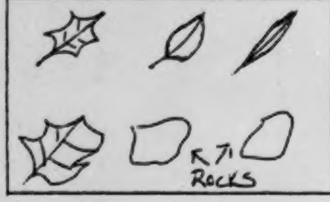
Name			
Number of Steps			

Who took the most steps? ________

Who took the least steps? ________

What is the difference between the most and the least? ________

3. Make sets of natural objects. Draw your own pictures. Write two addition and two subtraction sentences for each.

4 + 2 = 6 6 - 2 = 4

2 + 4 = 6 6 - 4 = 2

4. Take a walk down Deep Forest Path to the measuring logs. Measure the length, the diameter (thickness of the log), the circumference (distance around the trunk) for each log.

Log Number	Length	Diameter	Circumference
1			
2			
3			
4			
5			
6			
7			

a. Which log was the longest? __________

b. Which log was thickest? __________

c. Which log would give the most wood for our fireplace? __________

5. Draw a number from the sack, don't tell anyone what it is. Try to act out the number with your body. The others in the group will try to guess the number.

For each number, list a natural object which has that number of parts. i.e. 6 - six legs on an insect.

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

6. Draw a picture of something really small you saw today and a picture of something really big. Write a sentence about each picture.

Something Small

Something Big

7. Guess how much time your talk today took you __________

Ask your teacher how long the walk really was __________

Environmental Activities Training Project
Fallen Timbers Consortium Schools
1927 Main Street, Green Bay, WI 54301

Reprint:
Project I-C-E RMC
1927 Main Street
Green Bay, Wisconsin 54301

Environmental Field Activity: Warmed Over Soil

Recommended Grades: Seasons: 3-4 Fall/Spring

Author(s): Carol Oshefsky

Cormier, Ashwaubenon

Concepts:
6. Natural resources
2. Ecosystem

Integrated with:
- Science
- Language Arts
- Mathematics
- Social Studies

Objective(s):

Students will determine difference in temperature of air and soil in three different locations by using a thermometer and record observations relating to difference at each site.

Rationale:

A better understanding of ecosystem can be initiated early through simple tasks which, at the same time, teach youngsters skills in measurement, observation and analysis. Why things grow in one place and not in another can also be equated why people live in some areas and not in others as a simple environmental concept.

Soil Activity Worksheet ______________________________

Select three divergent soil pit areas. Dig a hole about four inches deep at each. Carefully place a thermometer in the soil pit bottom, cover with loose dirt; wait a few minutes (3-5).

		Pit #1	Pit #2	Pit #3
1.	Record soil temperature	______	______	______
2.	Record air temperature above pit	______	______	______

3. Describe plants in pit area
P-1 ______________________________
P-2 ______________________________
P-3 ______________________________

4. Describe soil color
P-1 ______________________________
P-2 ______________________________
P-3 ______________________________

5. Describe soil moisture
P-1 ______________________________
P-2 ______________________________
P-3 ______________________________

6. Describe soil texture
P-1 ______________________________
P-2 ______________________________
P-3 ______________________________

7. Describe type of material in soil (litter, duff, humus)
P-1 ______________________________
P-2 ______________________________
P-3 ______________________________

8. Conclusions: How do pit areas #1, #2 and #3 differ? Why? For example, there is little or no plant life in pit #2, why?

9. If the pit areas were actually large tracts of land, in which areas would people likely live? Why?

Key: Litter - Identifiable dead things
Duff - Partially decomposed organic matter
Humus - Completely decomposed; unidentifiable

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Fallen Timbers Consortium Schools
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Reprint:
Project I-C-E RMC
1927 Main Street
Green Bay, Wisconsin 54301

Environmental Field Activity: Sherlock Holmes, Anyone?

Recommended Grades: 3-5 Seasons: Fall, Spring

Author(s): Ann Kottke

Westwood Elementary, DePere

Concept(s):	Integrated with:
2. Ecosystem	Science
8. Attitudes and Values	Social Studies
12. Stewardship	Language Arts

Objective(s):

Within the larger context of traveling to and touring a nature trail, students will develop observation skills by noting a great variety of things and recording such observations on the worksheet.

Rationale:

There is that saying, "You miss seeing the tree for looking at the forest", which means we often fail to pick things out, or look at them, because they are lost within something bigger. This activity involves looking for a lot of things, some familiar and some not, some we have seen before and some not, and even more we never noticed before, even though they have always been there. By looking for such things specifically will help us to see even more of what there is to be seen while traveling to and touring a natural area.

Directions:

For the first activity, while traveling to the Nature Center, have students in each bus seat work as a team. The one by the window is the observor and the other is the recorder. The observor names as many different things as he/she sees along the route, and the recorder writes those down in the column provided. Later, they check their list against the things named in the other column, and connect them with lines.

To make it more interesting, have students fold the activity, using only the entry blanks, and at the completion of the trip, check it against the things listed.

- -

For the second activity, at the nature center, students could work individually or in pairs. String the class out, and proceed slowly along the selected trail. Stop frequently to allow students to look for the things listed. Allow them, if conditions permit, to go off the trail a short distance (several yards at most) to look for things.

At the conclusion of this tour, you could summarize class observations by tallying on a master sheet how many individuals or teams did see the things listed.

Meanwhile, back at the ranch (in class, that is), have students write a short paragraph about this trip. They could tell (write about) what they liked or disliked about it; what was the most interesting thing they saw and why. What was the most useful thing to them as persons? Why?

A. ON THE WAY

CHECKLIST OF POSSIBLE THINGS	LIST OF THINGS WE SAW ON THE WAY:
1. An airplane	
2. A crow	
3. A gravel truck	
4. A farmer plowing	
5. A silo	
6. A red barn	
7. A bicycle	
8. A dog	
9. A cat	
10. Herd of cows	
11. A horse	
12. Any red truck	
13. A yellow car	
14. A schoolhouse	
15. An electric fence	
16. A fire station	
17. A station wagon	
18. A motorcycle	
19. An unpainted barn	
20. An American flag	
21. A gravel road	
22. A plowed field	
23. A sign that says DePere	
24. A sign that says Seymour	
25. Another school bus	
26. A stop sign	
27. A viaduct	
28. A tractor	

FOLD HERE

B. NATURE TOUR

1. Look for insects on a tree. What color? __________ Large or small? __________

   Look for insects on the ground. Color? __________ Large or small? __________

   Look for insects in the water. Color? __________ Large or small? __________

2. Did you see any seeds? _____ Large or small? ________ Where were they? ________

   If they were moving, what made them move? __________________ Name some kinds

   of seeds you saw. ________ ________ ________ ________ ________ ________

3. Did you see any animal tracks? _______ Who made them? ______________________

4. Did you see a spider web? _______ To what was it attached? __________________

5. Did you see any moss? _______ Where was it? ________________________________

6. Turn over a rock. Did anything move underneath? _______ What? ______________

7. What sounds do you hear? ________ ________ ________ ________ ________

8. Did you see any plants having a hard time growing? _______ What was it hard for them? ____

9. When you were walking, where was it the noisiest? on ___________________________
   Where was it the quietest? on ______________________________

10. What color is the sky today? ______________________________________

11. Do you see any clouds? _______ If so, are they high or low? ________________
    Are they scattered or in puffy masses? _________________________

12. Are most of the trees tall or short? _____________ Close together? _______

13. What colors do you see in the leaves? ____________________________________

14. Did you see any living animals? _______ If so, what? _______________________
    Where was the animal or animals? ____

15. Did you see any bodies of water? _______ Where? ___________________________
    Did you see anything living in it? _______ What was it? __________________

16. Was most of the ground where you walked wet or dry? _______________________

17. Did you see any nuts? _______ What kind? _________________________________

18. Did you see any fallen tree? _______ Was anything growing on it? _______
    What? ________________________________

19. Did you see any bird's nests? Were they high or low? _______________________

20. Did you see many or few birds? _______ Did you know any? Name them.

    ________ ________ ________ ________ ________ ________ ________

21. Did you see any mushrooms? _______ Where? __________________________________

C. ON THE WAY HOME

1. When was Fallen Timbers organized? Who presented the park?

____________________ ____________________

2. What three materials are used on the trails? ____________________

____________________ ____________________

3. Where was the weather vane? What animal was used to show which way the wind blew?

____

4. What colors were used to make the signs at Fallen Timbers?

____

5. In the area between the parking lot and the wooded area at Fallen Timbers how many of the following are there?

picnic tables _____
fireplaces _____
bird feeders _____
boats _____
buildings _____
bells _____
maps _____
wells _____
benches _____
ponds _____

6. How were the benches different from most outside benches?

____

7. How were the trail maps protected? ____________________

____

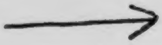
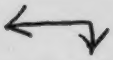
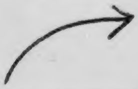
8. What was the name of the trees that are dying? ____________________

Why are they dying? ____________________

9. What was the main building made of? ____________________

10. How was the building heated? ____________________

On your bus ride to Fallen Timbers, tally and total the following items:

SIGNS	BUILDINGS	EXTRAS
STOP	BLUE GLASS SILO (HARVESTORE)	WINDMILL
DEER CROSSING	SILO WITH NO ROOF	WOOD PILES
RAILROAD	TRAILER HOME	CLOTHESLINE WITH CLOTHES
	YELLOW HOUSE	DOG COOPS
	SNOW WHITE SILO	HORSES
	ABANDONED FARM BUILDINGS	SWIMMING POOLS
EE	OLD SCHOOL HOUSE	HIGH POWER LINE
U	CORNCRIB WITH SOME CORN	BRIDGES
DON'T KILL BABIES! PROTECT THEM!	NURSING HOME	FLAG
STONE QUARRY	FORT AND STOCKADE	CEMETARY
A & W	CHURCH	SWING SET
DE PERE	BIRD HOUSE	RADIO OR TV TOWER
SNOWMOBILES FOR SALE	TENT	STATUE

Reprint:
Project I-C-E RMC
1927 Main Street
Green Bay, Wisconsin 54301

Environmental Activities Training Project
Fallen Timbers Consortium Schools
1927 Main Street, Green Bay, WI 54301

Environmental Field Activity: Plants of the Apes and Man

Recommended Grades: 3-5 Seasons: Fall, Spring

Author: Mrs. Julie Vargas

St. Boniface, DePere

Concept(s):
1. Energy
2. Ecosystem
3. Carrying Capacity
4. Water
5. Air

Integrated with:
Social Studies
Science
Language Arts

Objective(s):

Students will develop the concept of dependence on nature by properly connecting themselves to various things observed in a given natural area.

Rationale:

Sometimes we go on in life thinking the world belongs to us. Maybe if we observe and think a little on the things around us, we may decide that we belong to the world. And if that world is going to continue to sustain us, we may even have to decide to take better care of what we have available.

Directions:

1. In a given natural area, individually or in small groups, take 15 or 20 minutes to walk around and look closely at the many things you can observe.

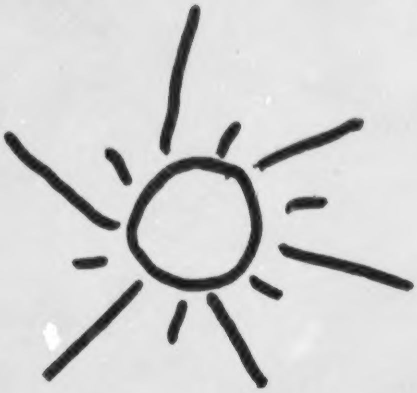
2. On the worksheet, provide the major name type for the things labeled "A", "B", "C", "D", "E", and "F".

3. Then for those that have numbers listed underneath, write the names of the different kinds of the type you identified, IF you see them on your walk through the area. We will help you with "F", for example "1" could be a pond, are there others you can list? You may add more kinds than are listed if you see them in the area.

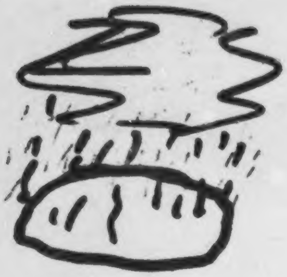
4. When you have completed your list, draw lines to connect things one to another if they depend on each other for any reason at all.

5. On the other side of the worksheet is a question you should answer in a few short sentences for each part.

6. At the end of the activity, as a class, tell about the things you saw, show how you connected the various parts, and tell what you wrote about the question. Make notes on things others said that you did not think of.



E. ____________________

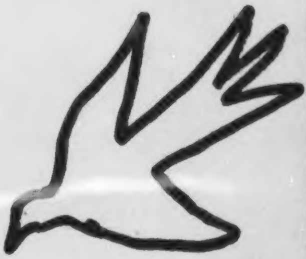


F. ____________________

1. ________________

2. ________________

3. ________________



D. ____________________

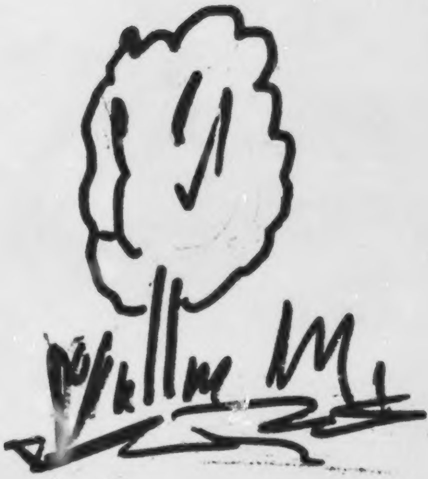
1. ________________

2. ________________

3. ________________

4. ________________

5. ________________



B. ____________________

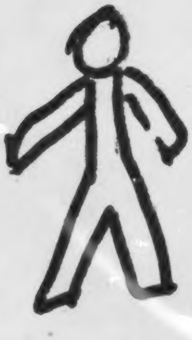
1. ________________

2. ________________

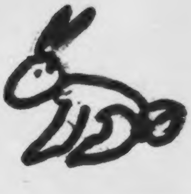
3. ________________

4. ________________

5. ________________



A. ____________________



C. ____________________

1. ________________

2. ________________

3. ________________

4. ________________

5. ________________

Question:

For each pair of things listed, tell in a few short sentences why they depend on each other in some way:

"A" to "B": ______________________________

____

____

____

____

"A" to "C": ______________________________

____

____

____

____

"A" to "D": ______________________________

____

____

____

____

"A" to "E": ______________________________

____

____

____

____

"A" to "F": ______________________________

____

____

____

____

Environmental Activities Training Project
Fallen Timbers Consortium Schools
1927 Main Street, Green Bay, WI 54301

Reprint:
Project I-C-E RMC
1927 Main Street
Green Bay, Wisconsin 54301

Title: Animal Tracks

Author: Suzanne Simon

Grade Level: 3-6

Disciplines:

Science
Math
Language Arts

Concepts:

2. Ecosystem

Behavioral Objectives:

The students will be able to record observations and measurements made of the tracks and tell about the animal by observing the tracks for at least three different animals.

Directions:

Break the class into teams of four. Each team will then look for different tracks in a designated area. A low wet area or nearby pond is best. You may want to make plaster casts of some of the tracks.

Casts of Animal Tracks*

Find a sharp, clean-cut footprint of an animal in mud, sand, or wet snow; stand a cardboard collar around it. Mix plaster of Paris and water until just thin enough to pour, and fill the track to the top of the collar. Allow the plaster to stand about fifteen minutes to harden, then pick the plaster up collar and all, and wrap carefully in newspaper to prevent rubbing while it is still slightly soft. When thoroughly dry and hard, brush off any sand or mud which may be clinging to the track and you will have a negative or raised cast of the footprint. To make the positive, grease the negative cast, fit a cardboard collar around it and fill with more plaster of Paris. This second cast will be the positive, showing the sunken impression of the animal's foot just as it appeared in the mud or sand.

* From Audubon Aids; Animals and How They Live, Cast of Animal Tracks.

Look carefully for different animal tracks. Be careful not to destroy any that you find.

Answer these questions on your sheet for each track you find. Look for at least three different tracks.

1. How long is the track?
2. How wide is the track?
3. How many toes on a fore foot?
4. How many toes on a hind foot?
5. Is the track old or new?
6. Draw a sketch of the track.

For each group of tracks you find answer these questions.

7. What direction was the animal traveling?
8. Was the animal walking or running?
9. What other signs of the animal are there?
10. What are the feet adapted for? (climbing, grasping, running)
11. What kind of food would this animal eat?
12. What is the name of the animal?

Environmental Activities Training Project
Fallen Timbers Consortium Schools
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Reprint:
Project I-C-E RMC
1927 Main Street
Green Bay, Wisconsin 54301

Environmental Field Activity: Cold White Stuff

Recommended Grades: 3-6

Author: Frances Gerber

Concepts:
1. Energy
2. Ecosystem
3. Water

Integrated with:
Science
Math
Art
Language Arts

Objectives:

Child will observe snow forms and draw conclusions about them, use linear measurement correctly, read thermometers correctly, record data in a meaningful way, observe and sketch required materials, read a compass, and write a summary statement using gathered data.

Rationale/Directions:

This is a group of activities involving observation, measuring, drawing and summarizing of conclusions about snow. It can be done in a unit on charts, or a unit on water. It can be a practical method of teaching measuring and everything could be measured with meter sticks, if the teacher wishes. The work will be done best if there are snow drifts in a relatively open area.

Activities:

1. Using a core drill, drill into 3 or 4 snow banks and find layers of snow. Sketch layers, noticing density and width of layers. Discussion of snow storms and how snow changed.

   Equipment: Core auger, paper, pencil, ruler

2. Measure soil temperature and temperature above snow bank. Compare this over 5 days. Chart the results.

   Equipment: Thermometer, paper, pencil

3. Measure soil temperature beside cabin and at 3 foot (1 meter) intervals, away from cabin to see how a building's heat affects soil temperature. Chart the results.

   Equipment: Measuring stick, thermometer, paper, pencil

4. Hollow 4 snow caves from snow banks. Make 1 facing the wind, one on the leeward side. Make one six feet across and one three feet across. Measure temperature in all 4. Then place a candle in each and after a few minutes, measure temperature again. Chart and summarize results.

   Equipment: Measuring stick, candles, thermometer, pencil, paper

5. On a warm day, in the sun, place a white paper and a black paper on level snow. At the end of the day, measure how much the paper has sunk into the snow.

   Equipment: Black and white paper, measuring stick, pencil, paper

6. Measure the length, width and height of a snowdrift. Sketch or draw to scale on graph paper a cross section drift. Read compass to get wind direction when drift was formed.

   Equipment: Measuring stick, compass, pencil, paper

7. Look at snow flakes with a hand lens as they fall (classify into groups).

   Equipment: Hand lens, pencil, paper

8. Look at snow, packed in different densities with a hand lens. Look for snow crystals and identify types.

   Equipment: Hand lens, pencil, paper

9. Look for animal tracks, identify and sketch.

   Equipment: Guide book, pencil, paper

10. Look for meadow mice trails under meadow snow.

    Equipment: Guide book, pencil, paper

11. Take temperature of air in sun, shade windward, leeward side of buildings, draw conclusions.

    Equipment: Thermometer, pencil, paper

12. Make a snow gauge to measure snowfall. Let the snow melt after storm and measure water in gauge for real amount of moisture. Draw conclusions.

    Equipment: Jar with measurements marked

For fun: Make snow paintings with powder paint in salt shakers. Observe over several days how the pictures last. Play fox and geese either with trails or circle. Even in the winter, cook something over a fire.

WORKSHEET FOR COLD WHITE STUFF

Name ______________________________ Grade __________

Activity 1. Draw your sketch of what you see in the sample of the drift. Show layers clearly. Measure each layer if you wish.

Activity 2. Temperature

	Monday	Tuesday	Wednesday	Thursday	Friday
Temp. above snow					
In soil					

Conclusions:

Activity 3. Soil temperature at different distances from building.

At building	3'	6'	9'	12'
________	________	________	________	________

Conclusion:

Activity 4. Snow cave temperatures

Facing wind __________ Leeward side __________

3 foot cave __________ with candle __________

6 foot cave __________ with candle __________

Activity 5. Melting snow under black and white paper.

Lowered	Black	White
Distance	________cm	________cm

Activity 6. Measuring snow drift. Sketch of drift.

Length __________ Width __________

Height __________

Wind direction when drift was formed ________

Activity 7. Snowflakes.

Tally	Star	Hexagon	Icy
Totals	______	______	______

Activity 8. Use chart of snow and ice crystals - tally forms.

Activity 9. Draw track or list tracks found below.

Activity 11. Temperatures

Windward ______ Leeward ______ Shade ______ Sun ______

Activity 12. Comparing snowfall amount to real amount of moisture.

Environmental Activities Training Project
Fallen Timbers Consortium Schools
1927 Main Street, Green Bay, WI 54301

Reprint:
Project I-C-E RMC
1927 Main Street
Green Bay, Wisconsin 54301

Title: Excursion to Another World

Author: Suzanne Simon

Grade Level: 3-8

Seasons of use: Spring, Summer, Fall

Disciplines:

- Science
- Social Studies
- Language Arts

Concepts:

2. Ecosystem
3. Carrying Capacity
4. Water
12. Stewardship

Behavioral Objective:

Students will state the importance of a pond to their own life system as they recognize similarities and differences by collecting, drawing and recording data on the organisms found in a pond.

Equipment:

One for each team: aquatic collecting net, white trays, small dish, Golden Guide "Pond Life", forceps, eye dropper, hand lens, pencils, clipboards, thermometer, dissecting microscopes

Directions:

Divide the class into teams of four or five. Assign one student as team leader. Set the mood as one of adventure and exploration. Stress the delicacy of the pond environment. When the students are ready to do the collecting make sure that only those with collecting equipment are in the water. If possible, use dissecting microscopes to observe the organisms. You may want to take one mason jar full of pond organisms back to the classroom for further identification.

Student Worksheet

Names: Leader ______________________ ______________________

______________________ ______________________

As scientists from the planet Earth, your job today is to investigate the inhabitants of another world. This world is very delicate, you must use extreme caution in handling it. Too much disturbance will destroy the world and kill anything living in it. So far it is not considered to be dangerous.

The life in this world is different from much of the life you are familiar with. Your job is to find and describe the life and the environment of this new world. Use the worksheets provided to do this. Proceed carefully, take mental pictures often, and remember it is up to you to understand the everyday activities of the inhabitants of this world.

ASSIGNMENT #1

Map the "world". Draw a general sketch, include any interesting landmarks.

ASSIGNMENT #2

Describe the general environment - this is very important in understanding how anything might live in this world.

Temperature ________________

Soil or bottom type ________________

Color of water ________________

Water flow ________________

In your own words, describe this new world. Include sounds, smells, general impressions, and how you think it might change in one year.

ASSIGNMENT #3

Can you find any producers (plants) in your world? What are they like (size, floating or rooted, etc.)? Describe or draw a picture of the producers.

ASSIGNMENT #4

This is the most important part of your exploration. So far you have been able to stay within your spaceship. Now you are ready to go into this new world. Remember to be very careful, the life is very sensitive. If you disturb it the living things will panic and you will be unable to gather information vital to your mission. Only scientists with the proper equipment may venture out of the ship into the new world; the rest of the scientists will be responsible for the observation and recording of the collected material.

DRAW A PICTURE OF EACH TYPE OF ANIMAL YOU FIND (Write the name of the insect if you know it.)	NUMBER FOUND	NAME

DRAW A PICTURE OF EACH TYPE OF ANIMAL YOU FIND (Write the name of the insect if you know it.)	NUMBER FOUND	NAME

HOW ARE THE ANIMALS YOU FOUND ALIKE?

HOW ARE THEY DIFFERENT?

WHAT MAKES THEIR WORLD A GOOD PLACE FOR THEM TO LIVE?

TRY TO FIND OUT HOW ONE OF THE ANIMALS LIVE, INCLUDE ITS FOOD, HOME, ENEMIES AND ANYTHING ELSE YOU CAN FIND.

HOW IS THIS TYPE OF WORLD IMPORTANT TO YOU?

Environmental Activities Training Project
Fallen Timbers Consortium Schools
1927 Main Street, Green Bay, WI 54301

Reprint:
Project I-C-E RMC
1927 Main Street
Green Bay, Wisconsin 54301

Title: How Hard Does the Wind Blow?

Recommended Grades: Seasons: 3-8 All

Author: Suzanne Simon

Adapted from "Wind", National Wildlife Federation

Concepts:
1. Energy
6. Natural Resources

Integrated with:
Earth Science
Geography

Rationale:

Air movement is one part of the complex physical events, such as wind, temperature, humidity, light and precipitation, which together are called weather.

In this exercise, the students will learn that wind speed and direction are affected by physical objects in the environment.

Equipment:

One handheld anemometer per team
One thermometer per team
One compass per team

Directions:

Each team will receive one handheld anemometer (wind meter).

Practice using the gauge. Stand by the weather station. Point the gauge into the wind. The small white bead in the gauge will move up the left hand scale as the wind gets stronger. If the wind is greater than 10 mph the white bead will go all the way into the red top. Then place your thumb over the hole in the red plastic top. Read the wind speed from the scale on the right.

1. On the map, draw an arrow pointing in the same direction as the wind.

2. On your data sheet, write down the wind speed from the gauge.

3. Check the anemometer (wind speed meter) at the weather station for that wind speed. Write that on your data sheet.

4. Each team should find a spot near the weather station which has a very weak wind. Write down the wind speed and exact location on your data sheet.

5. Find a spot near the weather station which has the strongest wind. (On the gauges the strongest wind will read 30). Write the number and location on your data sheet.

6. How were the locations of the slowest winds different from the locations of the fastest winds? As a class, write down the general characteristics of areas with fast wind and with slow wind.

7. Take the temperature near the weather station. Write the temperature on your data sheet.

8. On your maps, special areas have been marked. These are: cabin area, rifle range, shrub area, pond and dike and forest. Each team will go to a different area. Locate spots where the wind direction is the same as the wind direction at the weather and spots where it is different. Use your compass and anemometer for this. Record these spots by drawing an arrow on your maps. If it is near a landmark which is not on your map sketch it in.

9. Record on your data sheet the wind speed at different locations.

10. If there is time, move on to a new area.

11. As a class, discuss the following questions:

    a. What similarities are there in areas which have the same wind direction?

    b. What causes wind to go in different directions?

    c. What area had the most different directions? Why?

    d. What area in general had the weakest wind? Why?

    e. What one spot (or spots) had the weakest wind?

    f. Which area in general had the strongest winds?

    g. Which areas had the highest and lowest temperatures? Why?

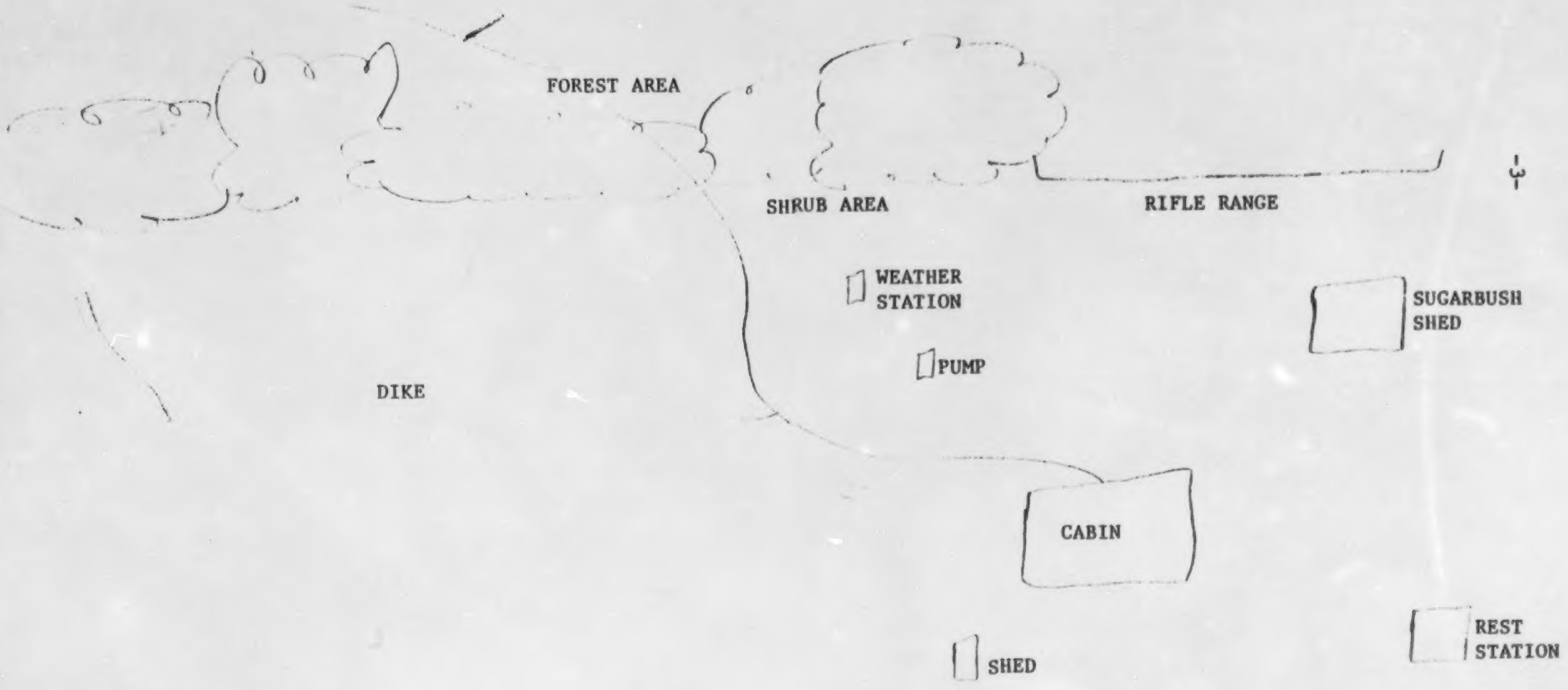
    h. How does wind affect temperature?

    i. If you were a rabbit which area would be the best in which to live? Why?

    j. If you were a plant with fluffy seeds which area would be the best to live in? Why?

MAP OF FALLEN TIMBERS

YOUR SKETCH
OF AN AREA
IF NEEDED


FOREST AREA
SHRUB AREA
RIFLE RANGE
WEATHER STATION
SUGARBUSH SHED
PUMP
DIKE
CABIN
REST STATION
SHED

DATA SHEET

1. Wind speed with handheld anemometer __________
2. Weather station anemometer reading (wind speed) __________
3. Wind direction (from compass or weather station) __________
4. Temperature at weather station __________
5. Anemometer readings at locations near the weather station (to be done as entire class)

Location	Reading

a. Location and reading of weakest wind: ______________________________

____

b. Location and reading of strongest wind: ______________________________

____

6. Characteristics of areas with weak winds:

7. Characteristics of areas with strong winds:

The following activity is to be done in teams. Go to the area assigned by your teacher.

8. Location, wind speed and wind direction (using compass, optional) and temperature in different areas:

a. Cabin Area

Location	Wind Speed	Wind Direction	Temperature
1.			
2			
3			
4			
5			
6			
7			

b. Rifle Range and Backstop

Location	Wind Speed	Wind Direction	Temperature
1			
2			
3			
4			
5			
6			
7			

c. Shrub Area

Location	Wind Speed	Wind Direction	Temperature
1			
2			
3			
4			
5			
6			
7			

d. Forest

Location	Wind Speed	Wind Direction	Temperature
1			
2			
3			
4			
5			
6			
7			

e. Pond and Dike

Location	Wind Speed	Wind Direction	Temperature
1			
2			
3			
4			
5			
6			
7			

9. Number of times wind direction was similar to wind direction at the weather station ________

10. Number of times wind direction was different that wind direction at the weather station ________

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Reprint:
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Title: A Square Foot

Author: Suzanne Simon

Grade Level: 3-8

Disciplines:	Concepts:
Science	1. Energy
Math	2. Ecosystem
	3. Carrying Capacity
	8. Resources

Behavioral Objectives:

Students will recognize differences in the communities of two different areas by measuring out a square foot at two different locations and from areas identify, map and tally all the species they find.

Equipment: Clipboard, pencil, string in 4-foot lengths, paper

Directions:

The students may work individually or in teams of two. Give each student or team a 4 foot long piece of string. Direct them to place it on the ground in the shape of a square. They should then follow the directions on the worksheet. Make sure you have students working in several different habitat types, i.e., field, shrub area, forest. The most important part of the exercise is the comparison of the different areas. Lead the discussion to questions about the sun's energy, competition, and carrying capacity.

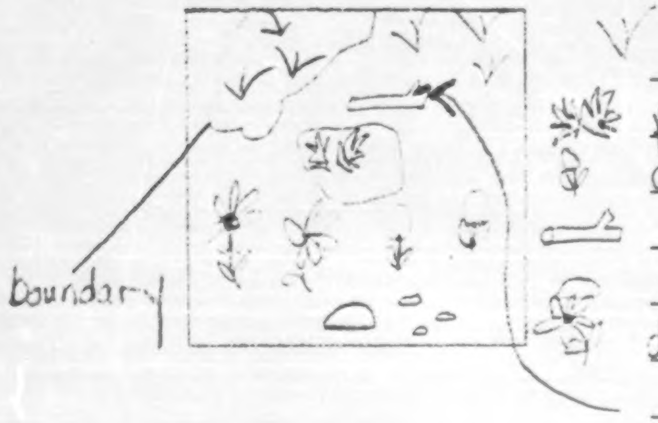
1. Using the string, map out an area that is one foot square. You are to explore and tally anything you can find in your area. In your notebook, categorize the various life forms in your square foot.

2. Draw or name the various plant forms, insect life, or animal signs in your mini-area. Also, classify any dead or non-living things found in your mini-area.

3. Keep a tally of the frequency of each item you have itemized. Be sure to look carefully, but do not damage or destroy anything in your area.

4. If time allows, take a square foot sample in a different habitat. How were the two areas different?

5. You could draw a picture of your own area.



grass 40 plants
prickers 6 plants
dandelions 4 plants
stick
rock
daisy-like flowers
cocoon

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Environmental Field Activity: This and That Tree

Recommended Grades: 4-6 Season: All

Author(s): Richard Birr
Rose Holschbach
Valley View Elem., Ashwaubenon

Concepts:
6. Natural resources
2. Ecosystem
1. Energy
8. Attitudes and Values

Integrated with:
Science
Social Studies
Language Arts
Art
Mathematics

Objective(s):

Students will locate five different shaped trees as directed, provide a basic description, and match the correct leaf for each leading to a correct identification of each tree.

Rationale:

Trees constitute one of our most valuable renewable natural resources and perform other important functions in the natural system. Surely, it would be desirable for each person to know the trees common to each one's geographic area and their value to man in general. It is one thing to have an expert to provide this information and another to find out for yourself. The latter way is more meaningful and lasting.

Directions:

1. In a natural area where there are a variety of trees, locate those whose shape (with or without leaves) fits the key in the blocked area on the worksheets that follow. Sketch the tree in the block area.
2. Each worksheet block asks you to describe the tree as directed.
3. Leaves from such trees may be observed or collected and either sketched or glued in the appropriate area.
4. From the information you have, using the leaf key or some other publication, identify the tree correctly.
5. Finally, investigate what is the most common use of the wood for these trees, and otherwise, why are trees valuable to man's environment. Write this up in a short paragraph.

Pre-Trip or Follow-Up Activities:

1. Have students become familiar with the Leaf Guide as attached; make some observations about the nature of each leaf.

2. Introduce students to some publication classifying trees, such as:

   A Field Guide to Trees and Shrubs
   George A. Petrides
   Peterson Field Guide Series
   Houghton Mifflin Company, Boston, 1968

3. Do library research on trees and lumber products; assign reports.

4. Research and discuss value of trees for reasons other than lumber; assign reports.

   a. Aesthetic landscaping

   b. Erosion prevention

   c. Carbon - nitrogen conversion

   d. Windbreak, shade, etc.

5. Have class or individual make a tree book of any imaginative design; or prepare a display from the more creative worksheets from this activity.

① Tree Sketch

Tree Key

SQUARE

⑤ What is the common use of wood from this tree?

____

____

____

____

② Description:

a. What is the bark like:

____

____

b. How are branches arranged on this tree?

____

____

c. What shape are the leaves?

____

____

d. Does this tree have nuts, berries, fruit, wings? What.

④ What is the common name for this tree?

____

③ Leaf Sketch

① Tree Sketch

Tree Key

OBLONG

⑤ What is the common use of wood from this tree?

____

____

____

____

② Description:

a. What is the bark like:

____

____

b. How are branches arranged on this tree?

____

____

c. What shape are the leaves?

____

____

d. Does this tree have nuts, berries, fruit, wings? What.

④ What is the common name for this tree?

____

③ Leaf Sketch

① Tree Sketch

Tree Key

TRIANGLE

⑤ What is the common use of wood from this tree?

____

____

____

____

② Description

a. What is the bark like:

____

____

b. How are branches arranged on this tree?

____

____

c. What shape are the leaves?

____

____

d. Does this tree have nuts, berries, fruit, wings? What.

④ What is the common name for this tree?

____

③ Leaf Sketch

① Tree Sketch

Tree Key

CIRCLE

⑤ What is the common use of wood from this tree?

____

____

____

____

② Description:

a. What is the bark like:

____

____

b. How are branches arranged on this tree?

____

____

c. What shape are the leaves?

____

____

d. Does this tree have nuts, berries, fruit, wings? What.

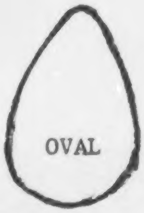
④ What is the common name for this tree?

____

③ Leaf Sketch

① Tree Sketch

Tree Key



⑤ What is the common use of wood from this tree?

② Description:

a. What is the bark like:

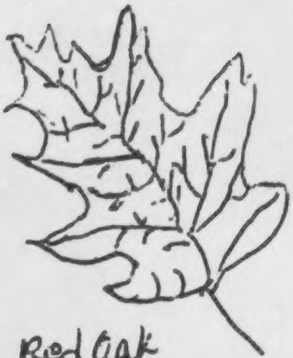
b. How are branches arranged on this tree?

c. What shape are the leaves?

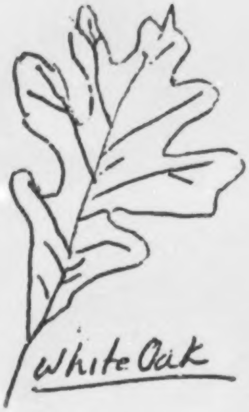
d. Does this tree have nuts, berries, fruit, wings? What.

④ What is the common name for this tree?

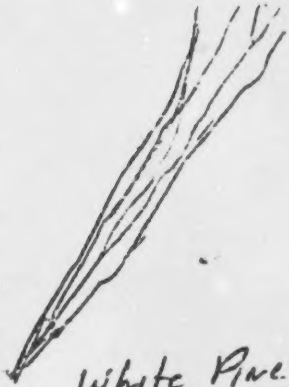
③ Leaf Sketch



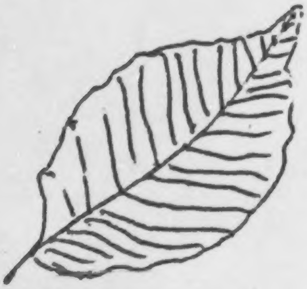
Red Oak



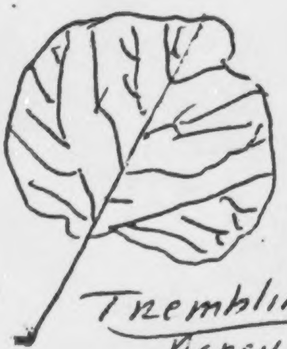
White Oak



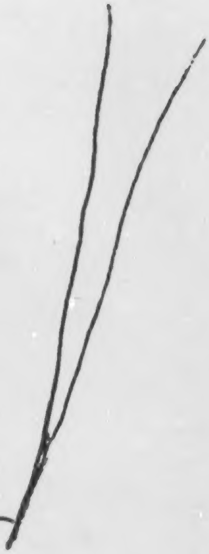
White Pine



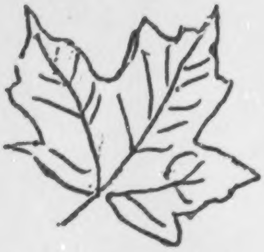
American Elm



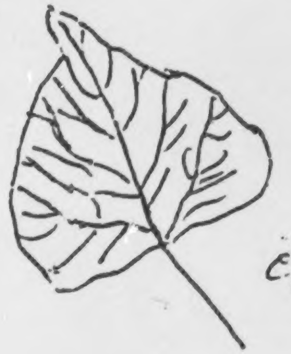
Trembling Aspen



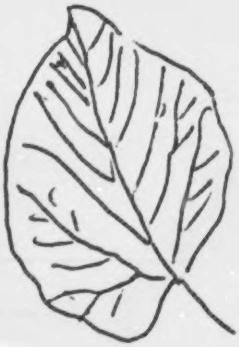
Red Pine



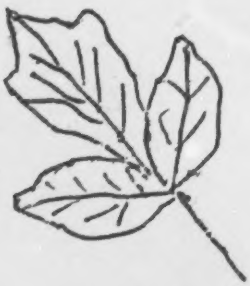
Hard Maple



Cotton Wood

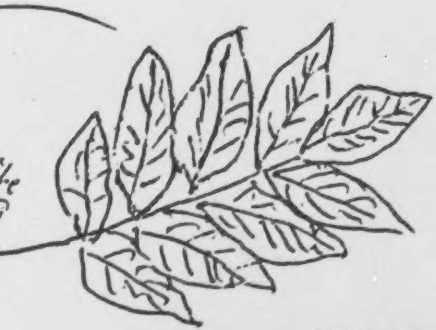


Basswood



Box Elden

White Ash



COMMON ☺ LEAF KEY

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Environmental Field Activity: Stick and Stones May Break Your Bones...

Recommended Grades: Seasons: 4-6   Spring/Fall

Author: Deborah Monfort

Rockledge Elem., Seymour

Concept(s):	Integrated with:
2. Ecosystems	Science
8. Values and Attitudes	Social Studies
12. Stewardship	Mathematics

Objective(s):

Through the activities suggested, students will identify at least three different bird nests by proper classification according to size, shape, and materials used in their construction, and at the same time, become aware of the needs birds have for shelter and species propagation as indicated by student comments relative to such needs.

Rationale:

An examination of bird nests takes us into the wonderful world and mystery of instinct. The labor and craftsmanship of birds in the construction of their nests is surely one of the enduring marvels of nature. Primitive man was able to copy some of this in the mud huts and thatched shelters he learned to build, but never with the same artistry as the birds!

Directions:

This activity is designed to promote knowledge of bird nesting habitats and an awareness of the need for preservation of the natural environment, as well as an appreciation of man's mental capacities as opposed to that of habit and instinct.

Inclass, pretrip, preparations should include the following:

1. Instructions on measuring diameter and circumference, using a ruler and appropriate formula.
2. Use of the following resources:
    a) Birds, Examining Your Environment, MacBean, Holt Publishing Co., pp. 46-49.

b) Filmstrips:

Birds We Know ______________________ (publisher)

Birds of Towns and Villages ______________________ (publisher)

c) Transparencies:

"Birds of the Woodland" ______________________ (publisher)

"Birds of the Field" ______________________ (publisher)

Materials Needed:

1. Clipboard
2. Measuring devices
3. Scale
4. Binoculars

Field Activity Outline:

1. Divide the class into teams of three students:
    1) Team Captain: Responsible for activity directions.
    2) Observor: Uses binoculars to provide information on size, shape, and materials of nests observed.
    3) Recorder: Records nest data on chart.
2. Take group along selected trail; disperse teams to different areas along the trail for 15-20 minutes to locate and observe various nests.
3. Within a given area, have students locate at least three different nests. Look into trees, shrubs, and on the ground. Observe firsthand if possible and with binoculars if necessary and provide the following information on each.

	Draw Shape of Nest	Size of Nest	Material Used	Location of Nest	What Bird?	Description of Nest Area
#1		Estimate Diameter __________ Height __________				
#2		Estimate Diameter __________ Height __________				
#3		Estimate Diameter __________ Height __________				

4. Questions to answer in the field:

    a) Do the nests appear to be hidden?, to blend into the natural landscape? How? Why?

    b) How are the nests fastened or secured in place?

Other Activities

1. If some old, unused nests are available, examine closely. In a brief paragraph, describe the construction.

2. For a class project, select one nest, and dismantle. Describe here all materials used in the nest construction.

3. From a supply of possible nest materials, construct one to resemble that of some bird original.

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Environmental Field Activity: In The Gopher's Backyard

Recommended Grades: Seasons: 4-6 Fall/Spring

Author(s): Deborah Monfort, Joel Cartier, Gladys Stein, Gary Schindler, Leon DuFoor, Robert Battisti

Rock Ledge Elementary, Seymour

Concept(s):	Integrated with:
6. Natural resources	Science
7. Land use	Social studies
12. Stewardship	

Objective(s):

Through a series of experimental exercises, students will develop basic skills to make simple soil tests and define and describe basic soil characteristics and the care necessary to preserve valuable soil.

Rationale:

Mother Earth is as varied as the many faces of Eve! And in what the gopher calls home, we can find the answer to such questions as: What kind of soil is needed for a garden? For a lawn? For trees and shrubs? For a good corn or oat crop? The gopher makes his hole through different soil areas, but he doesn't know that one is different or better than the other. When you do this activity, you will know more than the gopher!

Directions:

The students will proceed in rotating groups to different stations, selected beforehand to best illustrate soil conditions for the nature of the activity conducted.

Each station should have available the materials needed for the activity and all students should have the opportunity to participate directly. Data obtained and observations made should be discussed briefly to summarize activity at each station.

Activities:

Station A: Boring/Digging for soil profile.

1. By boring or digging to a maximum of three feet or to rock, examine the boring or digging, and as closely as possible, graph the soil profile on the scale-chart at right.

   Use a label key for each type, to necessary depth; for example:

   ▨ = sand

   If you can't label, describe it. Make and label your key here:

   Key

   ☐ = ____________________

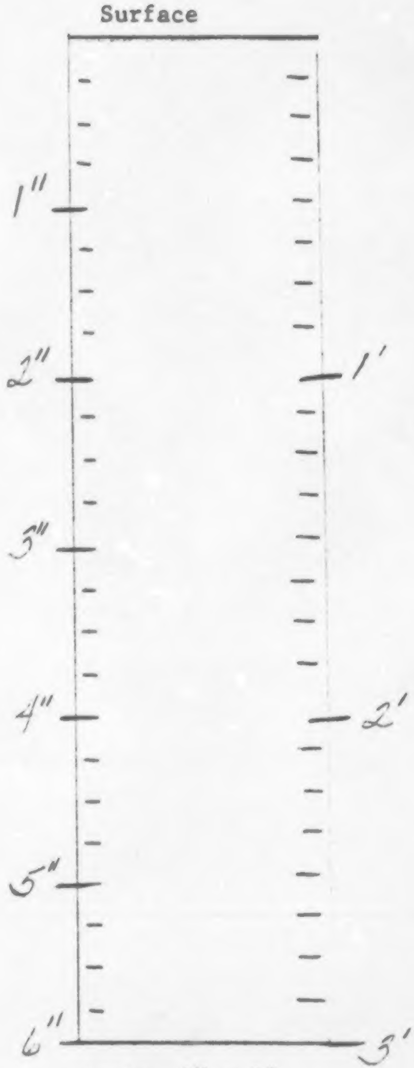
   ☐ = ____________________

   ☐ = ____________________

   ☐ = ____________________

   ☐ = ____________________

   ☐ = ____________________



Scale 2" = 1'

2. In group discussion and on the basis of the soil profile, answer the following questions:

   a) Soil is divided into layers. What is the name given to such layers? ________________

   b. Soil layers are different in color, texture, and thickness. What are the four main soil layers?
      1. ________________
      2. ________________
      3. ________________
      4. ________________

   c. What are the two types of basic material in soil?
      1. ________________
      2. ________________

   d. Using the type name from "c" above, label the following:
      Clay 1. ________________
      Humus 2. ________________
      Gravel 3. ________________
      Sandy Loom 4. ________________
      Sand 5. ________________
      Clay Loom 6. ________________
      Peat 7. ________________

   e. There will be no living animals or plants in what soil type? ________________

   f. Which soil layer is most valuable to man? ________________

Station B: Matter found in soil.

Each student team/group will take approximately one cup of topsoil and spread it on a piece of white paper/cardboard in order to examine composition: (Use hand lens, if available.)

1. Was the cup soil content light, dark, black? Describe:

1. ______________________________

2. Analyze and describe the plant matter in the soil:

2. ______________________________

3. Analyze and describe the animals found in the soil.

3. ______________________________

4. Besides the plant or animal contents, what other basic soil type did your cup contain? Describe.

4. ______________________________

Station C: Soil temperature and pH test.

Using two different locations, do temperature and pH tests and record your data:

1. Top of a knoll:

   a) What is the temperature of the soil at the surface? ____________________

   b) What is the temperature of the soil at a depth of six inches? ____________________

   c) pH test: (sample from topsoil)

      1) What color appeared? ____________________

      2) According to color chart, what is pH value of this sample? ____________________

      3) Is it acid or alkaline? ____________________

2. Base of a knoll:

   a) What is the temperature of the soil at the surface? ____________________

   b) What is the temperature of the soil at a depth of six inches? ____________________

   c) pH test: (sample from topsoil)

      1) What color appeared? ____________________

      2) According to color chart, what is pH value of this sample? ____________________

      3) Is it acid or alkaline? ____________________

Station D: Soil sifting.

Using a small mesh screen, student will sift soil samples and answer the following:

1. Where does sediment come from? 1. ______________________________

____

2. What kind of sediment falls out first? 2. ______________________________

3. What kind of sediment falls out last? 3. ______________________________

4. How does sedimentary rock form? 4. ______________________________

____

____

5. How does black dirt cause water discoloration? (Shake some into a container with water.) 5. ______________________________

____

____

6. Where does igneous rock come from? 6. ______________________________

____

____

7. How does metamorphic rock form? 7. ______________________________

____

____

8. How can we tell this history of an area from a soil cross section? 8. ______________________________

____

____

Station E: Soil erosion.

Activity: Water will be poured from a watering can onto a mound of topsoil. Water will continue to be poured until the height of the mound has been reduced by at least six inches.

Assignment: Answer the following questions:

Grade 4: Questions 1, 2, and 6.
Grade 5: Questions 1, 2, 3, 4, 5, and 6.
Grade 6: All questions.

1. How quickly did absorption of water by the soil stop and puddling begin? 1. ____________________

____

2. What color were the puddles? 2. ____________________

What caused the discoloration? ____________________

3. What size of soil particles were carried off first by runoff? 3. ____________________

____

4. What size of soil particles were carried farthest by runoff? 4. ____________________

____

5. What materials were left behind? 5. ____________________

____

6. When did little gullies start to appear on the mound? 6. ____________________

____

____

7. What would be the effect of increasing the flow of water? 7. ____________________

____

____

8. Explain what is meant by sheet erosion and gully erosion? 8. ____________________

____

____

____

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Environmental Field Activity: Tripping Through the Timbers

Recommended Grade(s): 4-6

Author(s): Denise Knoll
Vernice Kraft
Black Creek Elementary, Seymour

Concept(s):
2. Ecosystem
6. Natural resources
9. Change

Integrated with:
- Social Studies
- Language Arts
- Science
- Math

Objective(s):

Through the activities scheduled, students will check and record what they see, hear, smell, feel and otherwise observe or carry out on a selected trail.

Rationale:

There is a continuing need to develop the senses for more acute and detailed observation and awareness of things found in a given area. This activity calls for such sense--perception for many things--small or large, on one of the trails available. But the perception alone is not enough. Hence, at the end, they are asked to select two different things from the previous sections and write a short paragraph describing their relationship, i.e., how one affects the other, in any way. Beginning to look at such interrelationships gives real meaning to such an exercise.

(Students need something to write on, a pencil or pen, and something to measure with, metric if desired.)

Activity Directions:

1. As you walk the trail, look for the things listed below. When you see one, put an "X" in the corresponding box:

   ☐ where a fire has been
   ☐ a mushroom
   ☐ water
   ☐ a tree stump
   ☐ birch bark
   ☐ pine cone
   ☐ acorn
   ☐ a flower

☐ sap
☐ tree with smooth bark
☐ a spider web
☐ fungus
☐ moss
☐ a fern
☐ a berry
☐ an animal
☐ a bird nest
☐ a cloud
☐ a dead tree
☐ an insect

2. Approach the listening area quietly. Find a place to just sit, apart from others, and listen to the sounds you hear:

    a. Do you hear a bird? Where is it? What kind is it?

    b. Do you hear other persons? What sounds are they making? What do you think this does to other sounds you might be able to hear?

    c. Do you hear the wind? Describe his sound.

    d. Do you hear an animal? Where is it? What sound is it making?

    e. Do you hear anything else? Describe.

3. In the same area where you are sitting, find at least five different things within arm's reach to smell. List and describe what it is and how it smells to you:

   a. ____________________

   b. ____________________

   c. ____________________

   d. ____________________

   e. ____________________

4. Walk around in an area of about a 20-foot circle, now, and see if you can find things that might feel like the descriptive adjectives listed. Write down what it is that feels that way (do not collect, just feel).

   a. rough ____________________

   b. smooth ____________________

   c. fuzzy ____________________

   d. bumpy ____________________

   e. wet ____________________

   f. sticky ____________________

   g. crispy ____________________

   h. fluffy ____________________

   i. spongy ____________________

   j. prickly ____________________

   k. hard ____________________

   l. stringy ____________________

5. Of the things that you found and listed in #4 above, list below the things that are living or non-living:

Living	Non-Living
a. ______________	a. ______________
b. ______________	b. ______________
c. ______________	c. ______________
d. ______________	d. ______________
e. ______________	e. ______________

6. In this same area, try to find and describe things (or part of things) that have the following colors:

   a. red ____________________

   b. blue ____________________

   c. yellow ____________________

   d. orange ____________________

   e. black ____________________

   f. purple ____________________

   g. white ____________________

   h. brown ____________________

   i. green ____________________

7. Picking only from the forest floor, leaves that have fallen, find at least four different shaped leaves; describe them, and measure them at the widest and longest points. (These can be brought back to class.)

	Description	Measurements
a.		
b.		
c.		
d.		

8. Find a quiet spot, and for a few minutes think about the numerous things you saw, heard, smelled, or described. Now select any two different things and try to write a short paragraph on how they are interrelated. (Example: a leaf absorbs sun energy for the plant; what else does it do?)

Remember--for back in class, your favorite spot from this activity, for a picture that you will sketch.

Reprint:
Project I-C-E RMC
1927 Main Street
Green Bay, Wisconsin 54301

Environmental Activities Training Project
Fallen Timbers Consortium Schools
1927 Main Street, Green Bay, WI 54301

Title: Snow as an Insulator

Author: Suzanne Simon

Adapted from "Winter Activities" by Molly Redmond

Grade Level: 4-6

Season of use: Winter

Disciplines involved:	Concepts:
Math	6. Resources
Science	11. Individual Acts
Social Studies	

Rationale:

In Wisconsin, there has been increasing concern about the effects of snowmobiling and other winter activities on the ground under the snow. One major question concerns the value of packed snow versus fluffy snow as an insulator, and how important this insulation is to the plants and animals beneath. This experiment is best done on cold days. You can do this experiment on warm days too. Because snow is such a good insulator, it will keep the ground from warming too fast. Ask the students why it might be important to protect the ground from warming up too fast.

Procedure:

On a cold day, go to a place that has both untracked, unpacked snow and packed snow. Divide the class into teams and have each team record temperatures as listed on the student worksheet. Put the results on one large chart.

Equipment:

thermometers with long strings on (one for each team), sharp shovel, and a meter stick.

STUDENT WORKSHEET

Team ______

________________________________ ________________________________

________________________________ ________________________________

Each team will take temperature readings and depth readings. When you take ground surface temperatures, fill in the snow around the thermometers in a well packed or fluffy manner, depending on which spot you are measuring. Be sure to have the bulb against the ground.

Air temperature ______ Wind speed ______ Wind chill ______

	Packed Snow	Unpacked Snow	Total Difference
Surface of snow			
Ground temperature below snow			
Depth of snow			

CLASS TEMPERATURE CHART

	Surface			Ground Temperature		
Team #	Packed	Unpacked	Difference	Packed	Unpacked	Difference
1						
2						
3						
4						
5						
6						
7						
8						

DEPTH OF SNOW

Team #	Packed	Unpacked	Difference
1			
2			
3			
4			
5			
6			
7			
8			

1. Where was it warmest? Why?

2. Where was it coldest? Why?

3. Where do you think most animals hibernate? Why?

4. Do you think the temperature change under packed snow could affect plants or animals? How?

5. Watch a field which had a snowmobile trail on it this spring and summer. Watch to see if the plants are different from surrounding areas.

Environmental Activities Training Project
Fallen Timbers Consortium Schools
1927 Main Street, Green Bay, WI 54301

Reprint:
Project I-C-E RMC
1927 Main Street
Green Bay, Wisconsin 54301

Title: Nature Scavenger Relay Race

Recommended Grades: Seasons: 4-6 Spring, Fall

Author: Jani Klozotsky

Little Chute Middle School

Concept(s):
2. Ecosystem

Disciplines:
Physical Education
Science
Reading

Objective(s):

While engaged in a physical education activity, students will correctly identify and gather some specific things found in a natural area as directed by a set of cards for each relay group.

Directions:

At the nature center pick up the shoe box containing four sets of cards. Each set of cards is color coded for the group. The shoe box is also divided and color coded. The cards should be stored in the front of the box until that particular object is located. Then the card is moved to the back of the box so no one else locates the same object. The team(s) which locate all, or the most, objects are the winners. The following are the objects on the cards, one for each set.

oak leaf
goldenrod gall
sow bug
moss (piece the size of your smallest finger
berry
red twig

spider
maple seed
birch bark--from dead wood
rock--larger than a fifty cent piece
red bug

maple leaf
worm
willow twig (with pussy-willows if in season)
grasshopper
grape leaf

Divide the group into four teams. Have the teams like up at a starting point. Assign each team a color.

The cards should be mixed up so the teams aren't looking for the same thing. The first person from each team takes their top card and tries to find that object. If, after a short period of time, they cannot find the object, the card is put on the bottom of the stack and the person takes the next card. When an object is found, the next person in line takes a card. Continue until all the objects are found or until time runs out. The winning team could receive a prize such as gum, candy, nuts or fruit.

Environmental Activities Training Project
Fallen Timbers Consortium Schools
1927 Main Street, Green Bay, WI 54301

Reprint:
Project I-C-E RMC
1927 Main Street
Green Bay, Wisconsin 54301

Title: Why Do The Timbers Fall?

Recommended Grades: 4-6

Seasons: Fall, Spring

Authors:
Myrth Fitzgerald
Beth Nide
DePere Schools
Suzanne Simon

Concept(s):
1. Energy
6. Resources
9. Change
10. Economic gains
12. Stewardship

Integrated with:
- Science
- Social Studies
- Language Arts
- Art

Objective(s):

Through several environmental activities and questions, the students will be able to identify the causes and implications of Dutch elm disease and will record pertinent information by means of rubbings. They will also express their feelings about the disease in a poem or paragraph and a drawing of a dead elm tree.

Rationale:

Since the Dutch elm disease was first accidently released in the United States, many millions of trees have died. Inadvertently, in trying to control the disease with DDT innumerable birds and wildlife were lost. The loss has also been great for the individual property owners who lost shade trees and had to pay for the removal of the trees. This exercise explores the life cycle of the tree, the evidence of disease and the spread of the disease through the forest. It also studies the role of the dead tree in the forest. This exercise compliments the environmental field activities Recyclers I and II.

Directions:

In school prior to the field trip study the history of Dutch elm disease. Have some of the students contact the city forester to find out how many trees have been removed and at what cost to the taxpayers. Have other students find out the cost to treat an elm and the cost of removing an elm from a city lot. Still other students could research and report on the effects of treating elm with DDT and others could report on the uses of elm wood in industry.

The field trip will further add to the information the students have found. Divide the students into teams of four or five. Give each team one set of directions. The artist should have several sheets of white drawing paper for the rubbings. The team leader should also have white drawing paper to hand out to each member for the last portion of the activity. Have the teams work in the same general area so you can easily discuss the implications of the disease in the forest and the potential usefulness of the dead wood.

(The reason you don't find many intermediate sized trees is because when the large elms were alive their canopy shaded the forest floor and prevented the growth of seedlings. When they died sunlight reached the forest floor and the seedlings started growing and are now saplings.)

Divide the class into teams of four or five.

Names ______________________ ______________________

______________________ ______________________

Choose one person to be the team leader, one to be the recorder and one to be the team artist. Everyone will be involved in doing the investigation. The team leader will keep his team busy doing the activities. The recorder will keep the written record for the team. The artist will take rubbings and make sketches where called for in the activities.

As a class you will go to an area with many dead, dying and windblown trees. Locate several dead trees and answer the following questions.

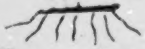
1. What is the name of the trees which are dying? ______________________

2. What are some of the characteristics of the tree which help you identify it?

3. Find a young tree of the species. How tall are the saplings? __________

4. Why don't you find many trees between the ages of the young saplings and the old dying trees?

5. The artist should take a small branch with several leaves on it, place it vein side up on a hard surface, place a sheet of paper on top of the leaves and rub with pencil or crayon until the shape of the leaves can clearly be seen. Also do a rubbing of some of the bark.

6. The European elm bark beetle is responsible for transmitting the Dutch elm disease. When the beetle lays its eggs it leaves a characteristic design which looks like this:  Look at trees without bark until you find this design. The artist should make a rubbing of this design. You may also find wormlike designs in the wood. These were made by other bark beetles which do not carry Dutch elm. Make a rubbing of these.

7. What do you think will happen to the beetles when all the elms die?

8. The beetles are carriers; they carry the spores of a fungus which gets into the tree when the beetle goes to lay its eggs. The fungus plugs up the tubes which carry water and minerals from the roots to the leaves. Look for examples of fungus and mushrooms on the dead trees. These are not the same fungus which causes the disease. You need a microscope to see that fungus. The artist should draw a picture of the fungus.

Write down the color, size and texture for each fungus.

____

____

____

These fungus are slowly helping to return the dead trees to the soil.

9. Animals also help to break down the dead trees. Look carefully at dead trees, under bark or in the wood for these animals. List any you find.

10. Other animals use the dead trees as homes. Look for these homes. List those you find.

11. Everyone in the team will now become an artist. Take a sheet of drawing paper. Sit by yourself and sketch a silhouette of [illegible] dead elm. Below the picture or on the back write a poem or a paragraph about the tree. You can write as if you're the tree and how, if it could talk, it feels or you could write about how you feel. You could also describe the day and how you feel about it.

Environmental Activities Training Project
Fallen Timbers Consortium Schools
1927 Main Street, Green Bay, WI 54301

Reprint:
Project I-C-E RMC
1927 Main Street
Green Bay, Wisconsin 54301

Title: Where Are the Animals?

Author: Suzanne Simon

Adapted from "Where Are the Animals?" by Molly Redmond; Nature Centers, Hennipin County Park Reserve District

Grade Level: 4-8

Seasons of use: All

Disciplines:

Science
Social Studies
Language Arts
Fine Arts

Concepts:

2. Ecosystem
9. Management
12. Stewardship

Behavioral Objective:

By library research on natural history of animals, together with outdoor investigation of animals and animal signs, students will be able to explain the concepts of habitat, community, and food chains.

Equipment:

Clipboards, pencils, data sheets, binoculars, magnifying glasses, small jars (to observe insects or pond samples--not for collection), field guides

Rationale:

This activity develops the following concepts:

1. Different kinds of plants and animals are found living in different communities.
2. Each type of plant or animal living in a community has its own special needs and abilities. Those needs and abilities will determine exactly where in the community the animal or plant will live. This area is its habitat.
3. If you can predict what a plant or animal needs to live, you have a better chance of finding it. The more accurate information you have on its needs, the more likely you are to know just where to look.

We are all part of a community. By studying the above concepts, the students will have an understanding of man's role in nature and have information which will enable them to make decisions about man's actions.

Directions:

Before doing the exploration part of the exercise go over the terms and inclass activities.

Before you go:

1) Terms

Community - as used here - is an area where plants and animals live together and depend on each other - a forest, a pond, a stream, a field, the strips of grass along the street, a vacant lot. If one type of thing is removed from a community, this loss will affect the other members.

Habitat - the place a plant or animal lives. This doesn't just mean the shelter or sleeping spot - but the whole area where it fulfills needs of food, water, air, shelter, protection, reproduction, etc.

Animals - (not just mammals) - any living thing that is not a plant.

2) Ideas

a) Your habitat must have what you use to live. What do you need to live? What things would you actually die without? What does a pigeon need? A spider? What common things do all animals need? (Air, water, food, shelter or protection, proper climate, more of their own kind, room to move around, etc.)

b) You can lead into the idea of a biological community by combining the concept of "habitat" with the more familiar idea of a social community. We need, in our habitat, food, water, shelter, provision for garbage and waste, non-poisonous air, a way to get from place to place, etc. We depend on other people in our community to provide us with these things we need. We depend on other animals and on plants, too, of course, but these may come from another area, so we depend on other people to bring them to us. What other things do we get in our community?

An example of a "biological community" might be a forest. Many animals and plants live in a forest community and depend on one another for the different habitat needs of each. A squirrel depends on a tree for food, shelter, and protection. A tree may depend on a worm to keep the soil loose, and may depend on the tree for shade. A rabbit might eat the violet. What else could happen in this forest? What needs what? (And who takes care of the garbage?)

c) Many animals are not tame. They hide from you and from other large animals. We can find out they're here, however, by finding the signs they leave around. This animal study can be compared to a detective hunting for clues to discover what's around.

Some animal clues are spiderwebs, tracks, droppings, feathers, half-eaten seeds, burrows, holes in trees, holes in leaves, bird sounds, cocoons on tree bark or leaves or under logs, etc.

d) We don't have to collect, kill, or destroy living things to learn about them. Doing this upsets the very delicate balance of life in a community. Don't collect the insects - they may pollinate a flower, be food for a frog, or help something decay. The acorn may be a squirrel's lunch. The bunch of weeds may be something's home or protection or food. Even a feather can be reused and be important to something in the community.

3) Activities

a) Search the school room for animals and animal signs - flies, spiderwebs, silverfish. Check dark corners, underneath radiators or cupboards, under boxes on the floor, on any plants, inside and outside window ledges. What kind of animals find the school room a good habitat? Why don't more?

b) Have the children see how many animals and animal signs - large and small - pets and wild - they can find on their way to and from school. Have them make predictions of what they'll find and where they'll find it. Were they right? What else did they find? What were the animals doing?

You might expand this to having each child sketch a map of his walk to school, and fill in where the animals were seen.

c) Going farther with (a), you might have them figure out (or look up) why they saw some of those animals - what are the food, shelter, water requirements and how are they met?

d) Divide the class into teams of 4-6. Assign one student as team leader, another as recorder, and the rest as observers. The observers should have binoculars or hand lens which they share with the rest of their team.

The Field Trip:

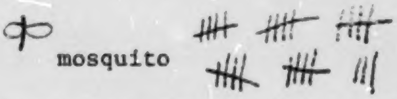
Start the class at one habitat type (pond, meadow, swamp, forest). Go over the directions. When finished with one habitat type precede to another. Use one data sheet for each habitat type.

1) The recorder should make a simple sketch of the profile of vegetation. The sketch should be arranged by height with enough space to write in observations (see example).

2) Record the animals and animal signs on the data sheets. If an animal moves from one level to another, use an arrow to show where it went.

3) Write down the names of the animal or animal sign if you can. If it is a new animal or a strange sign record it by drawing it or by careful description. (See example in data sheet - be specific when describing animals). "A bug" is not a careful description. "Red bug, six legs, black spots, pencil eraser size" is better.

4) Keep track of the numbers of each animal or animal sign found at each level. For example:



5) Stay in one habitat area for each data sheet. Use a new sheet for each new area. Spend about 20 minutes in each area. Look carefully, on the ground, under things, in trees and shrubs and in the air.

6) Do not hurt or remove any animals. We are guests in their homes and should treat them as our hosts. Return any rocks or logs which you might move. Don't collect nests or other treasures.

7) If possible, take pictures of each area. Fallen Timbers has cameras available but you must provide the film.

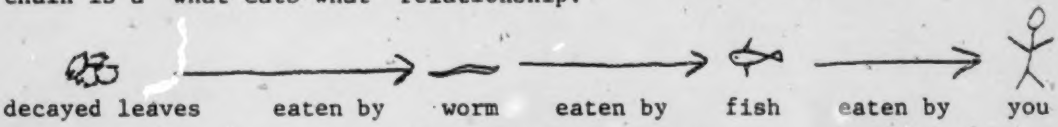
Possible Follow-up Activities:

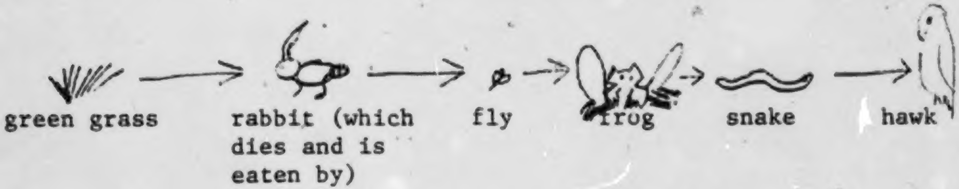
1) Make a large chart (possibly simply a large copy of the data sheet) or a mural on which you compile everyone's information. Figure out where the most animals were found. Why were they found there?

2) Break down animals found into different groups - Bird, Mammal, Insect, Fish, Reptile, etc.

What group had the most kinds in it?
What specific kinds of animals did you find most of? Why?
(What habitats - food, shelter, protection - were available?)

3) See if you can put together any food chains from your data. A food chain is a "what-eats-what" relationship.





Remember that each food chain starts with a green plant, for green plants are the only living things that can use the sun's energy to produce food. Plant eaters can then convert the plant food into energy usable by meat eaters.

4) Play a "Community Relationships" game.

Make a sign for each animal you found in some of the communities. Also make a sign for some of the different plants. Add one for "Sun" and one for "Decomposers" (fungus, scavenging insects, bacteria) which break down dead plants and animals, if the students don't think of these.

Pass the signs out to different members of the class. Have the class tell what the relationships are. (Does a robin need a tree? How?) (Does the tree need the sun? How?, etc.) Take a ball of string or yarn and connect each relationship the children find. Soon the room should be tangled up.

Then - emphasize how important each thing is by asking questions like "What would be affected if the robin died?" "What would happen if we cut down all the trees?" "What would happen if we cut down half the trees?"

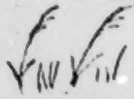
As each thing "dies", have the properly labelled child drop all his pieces of string. Can the community be reconstructed? If it can, how different would it be?

5) Many changes take place in the community over a year. Some animals leave or die or go underground or hibernate. Some can stay because they can stand any changes which might take place. These might include changes in temperature, food supply, shelter, water availability, and others.

Which of the animals you found are around all year? Do they make any changes? What?

What might be someplace else in another season? Why?

6) Once you have made up some food chains, you can make up a "food pyramid". This is a number grouping by food needs of plant and animal eaters.



A green plant is a food producer.

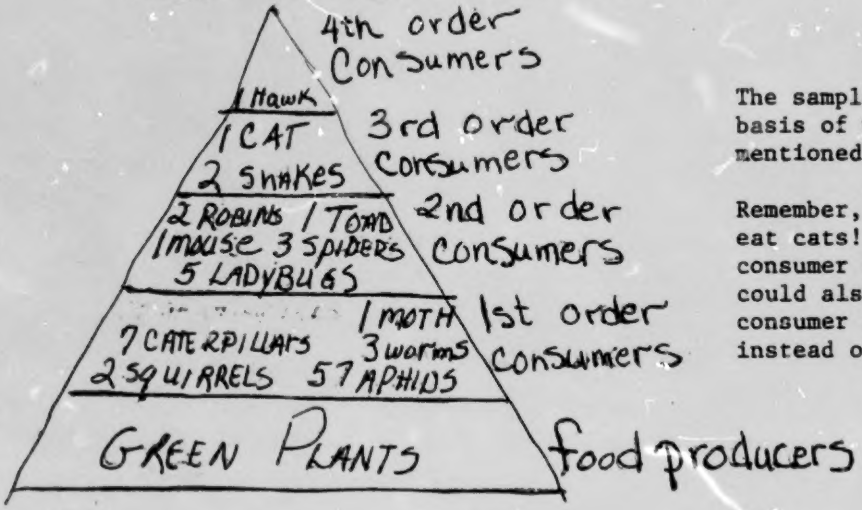
A plant eater (grasshopper) is a first order consumer.

An animal that eats the plant eater is a second order consumer. (frog)

An animal that eats the second order consumer is a third order consumer. (snake) etc.

This can get complicated, because the order changes according to what's eaten. If a mouse eats a berry, he's a primary consumer. If he eats a grasshopper, he's a secondary consumer.

The more different things an animal can eat, the more likely he is to live through changes in his environment. An animal that eats only one kind of food (koala bears eat only eucalyptus leaves) won't survive a change which harms his food. An animal that eats many foods (rats eat grain, garbage, almost anything) has a better chance of surviving changes affecting food availability.


4th order Consumers
1 Hawk
1 CAT
2 Snakes
3rd order Consumers
2 ROBINS 1 TOAD
1 mouse 3 SPIDERS
5 LADYBUGS
2nd order Consumers
1 MOTH
7 CATERPILLARS 3 worms
2 SQUIRRELS 57 APHIDS
1st order Consumers
GREEN PLANTS
food producers

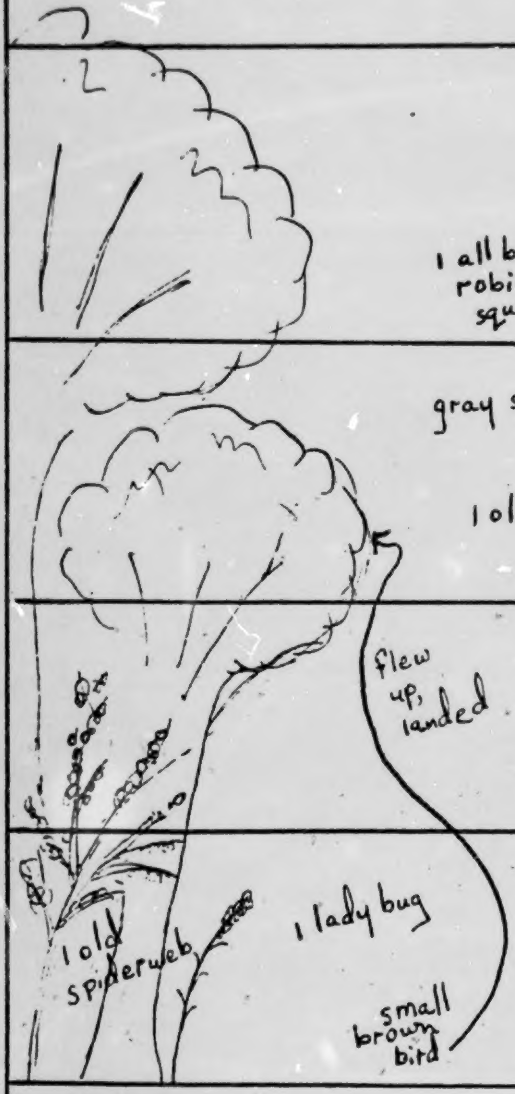
The sample is made up on the basis of what many of those mentioned often eat.

Remember, the hawk doesn't eat cats! He's just a 4th level consumer on this sample. (He could also be a second order consumer if he eats squirrels instead of snakes!)

What levels can people be? How many levels were you on when you were eating your breakfast?

Sample

Finding Animals and Animal Signs in the Park



Sky	4 pigeons 1 lage white bird skinny wings, sailing
Taller Treetops	2 gray squirrels jumping 3 robins 1 all black bird robin size squawky noises
(Lower Trees	gray squirrel holes in tree trunk 1 old hanging nest
Bushes	flew up, landed 1 old stick nest 2 black ants on tree trunk
Knee High	1 old spiderweb 1 lady bug small brown bird holes in leaves size green, 6 legs, feelers, wings about 50 on stem 2 black spiders O ← big
Ground and Below	ant hill hole red ants 𝍸 𝍸 𝍸 ||| 1", red-brown, feelers, long legs 1 blue feather white cocoon under a log 1 black and white cat pile of acorn shells

6

FINDING ANIMALS AND ANIMAL SIGNS IN A ____________________

Team Members: Leader : ____________________

Recorder : ____________________

Observers: ____________________ ____________________

____________________ ____________________

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Reprint:
Project I-C-E RMC
1927 Main Street
Green Bay, WI 54301

Environmental Activities Training Project
Fallen Timbers Consortium Schools
1927 Main Street, Green Bay, WI 54301

Environmental Field Activity: This Is My Leaf

Recommended Grades: 4-Adult

Seasons: All

Author: Robert Warpinski

Concept(s):	Integrated with:
8. Attitudes and Values	Social Studies
12. Stewardship	Art
	Language Arts
	Mathematics

Objective(s):

Through an intense examination of a leaf, students will identify and select from a mixed assortment of the same leaf type the one leaf that was the subject of their examination.

Rationale/Directions:

This is a specific acclimatization activity that compels the individual to examine a leaf in such detail and with such intensity that they identify with it at some later point when all such like leaves are mixed in a pile. The purpose is to sharpen awareness and perception skills and develop a feeling or an affinity for an object, and that such will carry over to other things in the man-made or natural world.

Using the outline and activities as suggested here will assure the intensity of observation/perception necessary and may also be a competitive game for persons involved--how many can pick out their leaf from the assortment available?

This activity may take place in class or at any outdoor site. We need only to collect leaves of one kind, somewhat similar in size, and in any season, whether green from a tree or fallen, dry leaves.

Students will need the worksheets, a firm surface, a pencil and crayon, and some measuring device as a ruler, caliper, etc.

Activity:

1. From the available assortment, select one leaf--this is your leaf to study in detail.
2. From the leaf key provided, develop a general description of your leaf:

3. Flatten your leaf out here and either trace its exact dimensions or place it underneath this spot and do a leaf rubbing. In any case, try to get every detail outlined in the drawing or rubbing:

4. Using the outline sketch or rubbing, provide in writing every detail about your leaf such as: smooth?, wavy?, teeth?, double teeth?, lobes?, veins?, color?, texture?, shape?, exact size in length?, width?

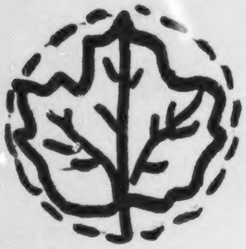
5. Pick out something unusual about your leaf; something it may suggest to you as you look at it from different perspectives and then write a creative paragraph about your leaf.

6. Now for the test: Give your leaf to the group leader (teacher) who will mark it with a number unknown to you, at the same time noting the number alongside your name on the roster. Use a double number for each, marking it with felt pen on the leaf. There will be 10 extra leaves mixed in the assortment, also with numbers, but not belonging to any person. With all the leaves so mixed, students take turns trying to select their leaf. When everyone has their turn, match the leaf number with numbers assigned to students. How did the group score?

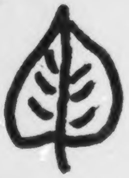
7. As a followup, students can share with others the one thing that helped them to correctly select their leaf.

LEAF KEY

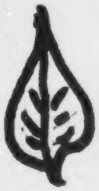
Common Leaf shapes



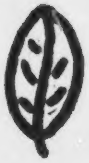
CIRCULAR



Heart

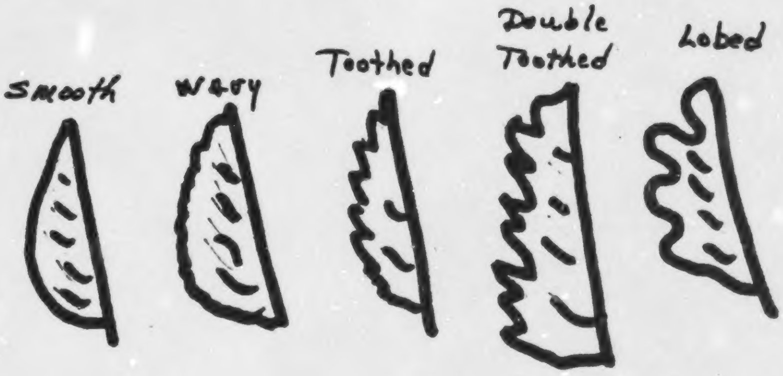


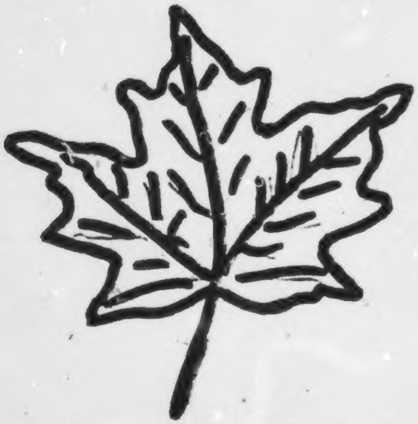
Triangular



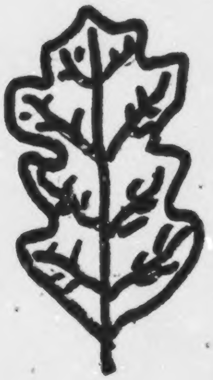
OVAL

Common Leaf margins

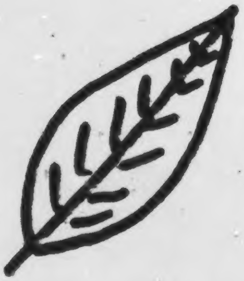

Smooth
Wavy
Toothed
Double Toothed
Lobed



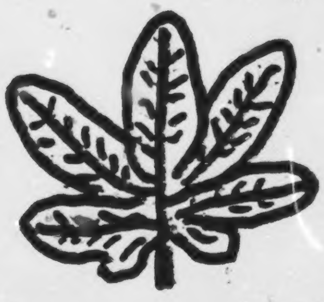
Veins from base



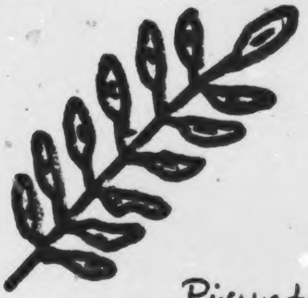
Long major mid vein



simple Leaf



Palmately Compound



Pinnate Compound

Reprint:
Project I-C-E RMC
1927 Main Street
Green Bay, WI 54301

Environmental Activities Training Project
Fallen Timbers Consortium Schools
1927 Main Street, Green Bay, WI 54301

Environmental Field Activity: The World and Me

Recommended Grade: 5

Author(s): Mrs. Pat Jansen

Sister Marian Diedrich

St. John's, Little Chute

Concepts:	Integrated with:
12. Stewardship	Religion (spiritual growth)
8. Values and Attitudes	Art
	Language Arts

Objective(s):

Through exploration of a variety of natural living things in a given area, students will demonstrate:

1. Appreciation for nature by sketching one thing observed and composing a creative, descriptive writing of that thing.
2. Awareness of their role as stewards of creation by short extemporaneous expressions of personal feelings as inspired by one or several specific things observed.

Rationale:

Each person needs to develop or sustain a sensitivity to the things in nature around him. There is beauty, wonder, and amazement in all things, little or big, and each has a part to play in the natural system of which man is a part. The human spirit needs to identify to this relationship in order to experience the fullness of what life has to offer. Such sensitivity and appreciation, developed early, will influence values and attitudes in a much broader context and cause man to see his role as steward as vital to his own well being as well as to all others in creation.

Directions and Activity Worksheet:

Pretrip discussion:

1. Have students develop their definition of the following:
   - a. Steward
   - b. Caretaker
   - c. User
   - d. Developer
   - e. Creation

2. Motivate students to sensitive observation and expression by asking for volunteers to take random things in the classroom and through chalkboard drawing and by words, describe them in minute detail and discuss their personal utility or value.

At the Site:

1. With all students gathered in a circle, have several students take individual verses or in chorus recite:

"In the beginning...", an adaptation from Genesis I.

In the beginning, everything was as black could be,
Then God made the heavens and the earth for you and me.
God said, "Let there be both light and darkness."
He called the light, the Day,
And the darkness He called Night.

Then He made the land and water, calling it the Earth and the Sea.
God then said, "Let plants and fruit trees grow up from the land;
Let there be both sun and moon and stars in the sky.

He looked now at this earth and saw that it was good.
He filled the water with different kinds of fish and let birds fly
    where they wish.
And every kind of living creature now He made.
God blessed them all and saw that they were good.

God, our Father, then looked upon this world
He'd made with so much care--
All was in readiness for the greatest thing He'd dare.
He now created People to use this earth He'd made
to be his loving children and someday his home.

God blessed His work,
And looked upon it
And knew that it was good.

2. Divide the class (group) into teams of four or five students and direct each team to different locations, within sight of teacher or other leaders.

3. During a 20-30 minute period, have each team member do the following from within the limited confines of their own individual area:

   a. Map and briefly describe the area within a 10-20 foot circle.

b. Describe what natural thing is most abundant within that area:

c. Is there anything that seems different or unique to that area? Describe.

d. Are there any animals or animal signs in this area? Describe.

e. Are there any natural sounds in this area? Tune in closely, describe.

Are there sounds coming from elsewhere? Describe.

f. What kind of feeling do you experience in this area? Describe.

g. Can you smell anything? What seems to create this smell? Describe.

h. Select one special thing that interests you most in your area. Draw it in this space. Around the sketch, in some creative way, write a paragraph or a poem on what this thing means to you, or how you feel about it, or what value this has to other things or to man.

i. Think about and briefly write on what responsibility you might have, in your role as steward or caretaker, for the thing you described in "h" above.

Follow up Activities:

1. As a team, for 10 minutes, share your best impressions, and then select the one thing that each member will report to the class. These can be taken from "a" a good map and description of the circle area; "b" description of the most abundant or unique thing; "c" animal or animal signs; "d" natural sounds heard and described; "e" the description of a feeling, or a smell in the area; "f" sketch and creative writing about that special thing; or "g" the expression of responsibility as steward or caretaker. (This can be done at the site or back in class.)

2. Provide time back in class for group sharing of maps, sketches, descriptions, and feelings about things.

Optional:

1. Record the activity by camera (Polaroid) or tape recorder.

2. For parochial schools, conduct an outside service that relates observations and experiences to the spirit of creation.

Reprint:
Project I-C-E RMC
1927 Main Street
Green Bay, WI 54301

Environmental Activities Training Project
Fallen Timbers Consortium Schools
1927 Main Street, Green Bay, WI 54301

Environmental Field Activity:	Stepping Off with Metrics
Recommended Grades:	5-6
Author(s):	Diane Shallue Little Chute Elementary

Concept(s):

2. Ecosystem
6. Resources
11. Individual Acts

Integrated with:

Mathematics
Language Arts
Social Studies
Science

Objective(s):

Students will record environmental factors in the immediate surroundings as they proceed per directions through six points using a compass and specified metric distances between each point according to pre-determined routes at the Fallen Timbers site.

Rationale:

Metric conversion can be fun if we do things other than what is in textbooks. And what better place than to apply metric and compass skills in a beautiful natural area. This activity combines such metric skills, use of a compass, team assignments, and recording observations at given points in a fun learning experience. What a way to learn!

Directions:

If the physical layout remains constant students, proceeding from given starting points, will find specific observation points of merit along the route.

Divide the class into four (4) teams of six (6) students each, recording names on the accompanying worksheet.

Explain use of a directional compass and metric tape measures to class (equipment available at Fallen Timbers).

Assign each team to one set of route directions. They should locate their appropriate starting point.

Materials needed: Compass, metric tape, worksheet, pencil, and clipboard or cardboard for writing surface.

Time: Approximately 45 minutes; add 15 minutes for group sharing.

Route directions for each team:

Group "A"

Start at south side of pole with transformer, then go:

1. South; 8m
2. East; 7m
3. South; 3m, 50cm
4. East; 4m, 50cm
5. South; 12m
6. East; 3m, 90cm

Group "B"

Start at north side of hollow stump, then go:

1. South; 5m, 20cm
2. Northwest; 1m, 80cm
3. Southwest; 10m
4. Southeast; 7m
5. East; 9m, 40cm
6. Northeast; 6m, 70cm

Group "C"

Start at north end of log nearest the big map, then go:

1. West; 6m, 40cm
2. Southeast; 8m, 20cm
3. South; 5m, 30cm
4. Northwest; 7m, 40cm
5. Southwest; 7m, 40cm
6. West; 7m, 60cm

Group "D"

Start at log on north side of the fire circle, then go:

1. North; 14m
2. Northeast; 10m, 20cm
3. South; 10m, 40cm
4. Northwest; 12m, 60cm
5. Southwest; 8m, 40cm
6. South; 5m, 10cm

Compass and Metric Measures Worksheet

Circle Group: A B C D

Student Name

1. ______________________________
2. ______________________________
3. ______________________________
4. ______________________________
5. ______________________________
6. ______________________________

Job and Description

Team Leader; checks to see that all do their task. Helps recorder and gives final report.
Director: Reads the group's directions step by step at each point.
Navigator: With the compass, walks a straight line as directed and measured.
Anchor Man: Holds the tape at each starting point.
Pathfinder: Metrically measures the required distance along directed path to required point.
Recorder: Writes description of the major item or most interesting things at each designated point.

Point Descriptions (All team members may contribute observations for the recorder's description):

Observation Point #1:

Observation Point #2:

Observation Point #3:

Observation Point #4:

Observation Point #5:

Observation Point #6:

For Extra Credit: Using a relative scale (approximate) have the team map their route, from starting point, to each point along route. Top of paper is North.

Reprint:
Project I-C-E
1927 Main Street
Green Bay, WI 54301

Environmental Activities Training Project
Fallen Timbers Consortium Schools
1927 Main Street, Green Bay, WI 54301

Environmental Field Activity: The Shape of Nature's Odds and Ends

Recommended Grades: Seasons: 5-6 Fall/Spring

Author(s): Mary Peerenboom

Little Chute

Concept(s):	Integrated with:
2. Ecosystem	Social Studies
6. Resources	Mathematics
8. Attitudes and Values	Language Arts
	Science

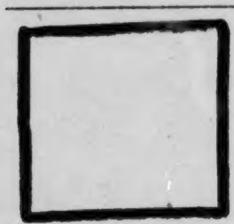
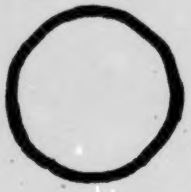
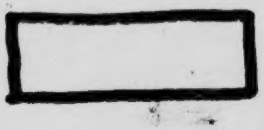
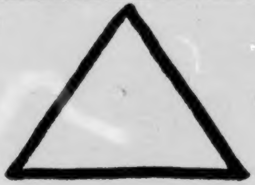
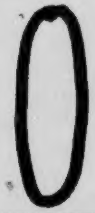
Objective(s):

Through scheduled activities, students will demonstrate perceptions of natural objects in relation to geometric figures and create preservation/conservation slogans for the natural area studied.

Rationale/Directions:

The several activities suggested here could be done together or independently and provide for a filler time slot as needed or be regularly scheduled. Classes can be divided into teams, each assigned a section to perform in detail or each student may be assigned the total activity. In the latter case, a longer time allotment is necessary. Students will need a firm writing surface.

Activity 1: List any natural objects you can find that have these shapes. Select one to draw for each shape. If name is not known, describe in sufficient detail.

 A.	 B.	 C,	 D.	 E.
Drawing	Drawing	Drawing	Drawing	Drawing

Activity 2

Look around the natural area for inspiration and create as many ecology slogans as you can using the first letters given. If the same slogan contains other words also beginning with the same given letter you can score double points: Example - Each beginning letter is worth five points, three words with the same letter in a slogan is 3 x 5 = 15 x 2 = 30.

I. Points

F

A

L

L

E

N

II.

T

I

M

B

E

R

S

III. Points

N

A

T

U

R

E

IV.

C

E

N

T

E

R

Total

Reprint:
Project I-C-E RMC
1927 Main Street
Green Bay, WI 54301

Environmental Activities Training Project
Fallen Timbers Consortium Schools
1927 Main Street, Green Bay, WI 54301

Environmental Field Activity: Pictures from Nature's Odds and Ends

Recommended Grades: 5-6 Seasons: Fall, Spring

Author: Jean Sandrock
Little Chute Middle School

Concept(s):

2. Ecosystem
3. Carrying Capacity
7. Land Use
8. Attitudes and Values
9. Change

Integrated with:

Art
Social Studies

Objective(s):

Students will create an art form using only natural materials as found lying about striving for the best characteristics of layout, form, color, design, texture and pattern.

Rationale/Directions:

Going back to primitive times, man used natural elements in his various art forms, and most often his art representations were also of things found in nature. While this is an exercise in creativity, the search for and the composition of an artistic design from such natural things as can readily be found may also inspire a greater appreciation for natural art and nature in general.

While not always necessary, some materials useful for this activity for each student or team are a 3' x 3' sheet of white paper as layout background. Such layouts could also be done on other backgrounds, including bare ground, grass, or other areas. A cutting shears might help fit things and avoid excessive overlaps. A camera, especially a Polaroid, would be useful for each class group to record such creations; some of the best could be mounted permanently for future display back at the ranch (school, that is).

There are no activity sheets for this exercise, only the following directions:

1. Organize class into teams of 3-5 students each.

2. If available, show some examples or discuss that best designs might be of persons, animals, monsters, or abstract.

3. Students may not pick any living plants, flowers, etc. but should use only things lying about such as leaves, bark, stones, twigs, dead grass, certain weeds, etc.

4. Assign students to a work area, restricting their foraging for materials.

5. Either use the 3' x 3' layout background sheet for the art composition or select an area of bare ground or other background.

6. A time limit of 20 to 25 minutes for the composition should be enforced, so that entire activity, including directions, evaluation and photos are accomplished in less than one hour.

7. Students can evaluate their creations, with class vote on the best two..

8. Those selected for permanent collection should be taken, others should be disassembled or scattered for natural restoration of the area.

9. From the experience and the photos taken, a followup discussion in class could focus on such elements as layout, textures, design, etc. important in any art form. Also, other natural elements that might make interesting art creations can be discussed.

Environmental Activities Training Project
Fallen Timbers Consortium Schools
1927 Main Street, Green Bay, WI 54301

Reprint:
Project I-C-E RMC
1927 Main Street
Green Bay, Wisconsin 54301

Title: Interrelationships in Nature

Recommended Grades: Seasons: 5-6 Spring, Fall

Author: Norb Wessley

Valley View, Ashwaubenon

Concept(s):
1. Energy
2. Ecosystem

Disciplines:
Science
Social Studies
Art

Objective(s):

Through the exercises scheduled, students will experience natural interrelationships between different communities, demonstrating their understanding by answers and statements made for the various activities.

Rationale/Directions:

Each student in the group should get the worksheet, a piece of drawing paper and a clipboard or piece of cardboard. Start at the pond for Activity I, proceed into the forest for Activities II-V and finish at the cabin area for Activities VI-VIII. At the end or back at school discuss the paragraphs the students have written. Talk about any aspect of an ecosystem they may have forgotten. Take the food chains the students developed and construct a food web. That will help explain the concept of a community. Then add the non-living aspects and you have the Fallen Timbers ecosystem. This could be done up as a collage back at school.

Interrelationships in Nature

Name ______________________________

I. At the pond, locate some water plants. Look at them closely.

   A. Are they submergent or emergent?

   B. Name two ways they are adapted to their environment.

      1.

      2.

   C. In what two ways are they different from land plants?

      1.

      2.

II. Sit in a comfortable spot in the forest. On a separate piece of paper sketch hardwood forest structure. Include as many of the following as possible, if present: canopy, understory, shrub layer, ground plants, litter and soil, and decomposers.

III. Part of Fallen Timbers in considered a swamp. List as many qualities as possible which make up a swamp.

   1.

   2.

   3.

   4.

   5.

   6.

IV. Locate any plants that are parasites or epiphytes (a plant growing on another plant but not living off it or hurting it). Describe the plant and where you found it.

   1.

   2.

   3.

   4.

   5.

V. As a group, sit for five minutes in complete silence listening to the sounds of nature. Write the sounds in the following space. Do not write the name of the thing making the sound, for example: Kiideerr, Kiideerr, Kiideee, ee, ee, ee, is the sound of a bird you might hear.

VI. What parts of Fallen Timbers could be considered a part of a man-made community?

VII. Sketch an example of a food chain found at Fallen Timbers. Start your chain with the sun.

VIII. Write a paragraph describing the entire ecosystem at Fallen Timbers.

Environmental Activities Training Project
Fallen Timbers Consortium Schools
1927 Main Street, Green Bay, WI 54301

Reprint:
Project I-C-E RMC
1927 Main Street
Green Bay, Wisconsin 54301

Title: Hot Diggity Dog

Recommended Grades: 5-7

Seasons: Fall, Spring

Author: Suzanne Simon

Concepts:
1. Energy
2. Ecosystem

Integrated with:
- Earth Science
- Math
- Social Studies

Objective(s):

Students in teams will compile and compare data on relative temperature statistics gathered at different locales. By responding to the questions that follow, students will demonstrate knowledge of effects temperature has on growth conditions.

Directions:

Divide the students into teams of four. Each team will measure the temperatures found in different habitats. Give each team a data sheet and assign each team to one of the habitat choices. Give them about 15-20 minutes to make the necessary measurements. As a group go over the temperatures which were found by each team. Keep track of the high and low temperature for each group. Discuss why or why not temperature differences were found. On cloudy days or cool days temperature differences will not be great. Have the students list other environmental factors which influence how the temperature feels to us. For example: wind and relative humidity.

HOT DIGGITY DOG Worksheet

Teams ______________________ ______________________

______________________ ______________________

Each team will measure the temperature of one region. The areas to choose from are: the field, the shrub area, the forest, the pond, and the cabin.

Area to be studied ______________________

Each team will take the following readings:

1. Air in shade ________
2. Air in sun ________
3. Soil surface in sun ________
4. Soil surface in shade ________
5. Soil temperature in sun four inches down ________
6. Soil temperature in shade four inches down ________

Measure the temperatures of the following if possible in your study area.

1. Water temperature ________
2. In tree bark in sun ________
3. In tree bark in shade ________
4. In grass ________
5. In a rabbit hole ________
6. In a bird's nest ________
7. Other ________________ ________

Compare your findings with the other groups.

1. Why is the temperature different in different places?

2. What is the warmest spot you found? Why?

3. What is the coldest spot you found? Why?

4. What was the warmest and coldest spot found by the class?

5. If you were to plant a garden where would be the best place? Why?

6. If you were a snake which area would be the best to live in? Why?

7. If you were a woodpecker in winter, which side of the tree would you look on for insects? Why?

8. How does wind affect temperature? From the weather station find out what the wind speed was today.

9. Would the warmest and coldest spot change if you consider the wind speed? In what way?

10. Can you name another environmental factor besides wind which affects how the temperature feels?

Reprint:
Project I-C-E RMC
1927 Main Street
Green Bay, Wisconsin 54301

Environmental Activities Training Project
Fallen Timbers Consortium Schools
1927 Main Street, Green Bay, WI 54301

Title: Snug As A Bug In A Rug

Recommended Grades: Seasons: 5-7 Winter

Authors: Suzanne Simon

Carol DeGroot

Valley View, Ashwaubenon

Concept(s):
6. Resources

Integrated with:
Math
Science

Objective(s):

Through the activities of recording data and making comparisons, students will demonstrate the effects of temperature, wind chill and other factors that snow has an insulating characteristic in the natural world.

Directions:

The students should be well acquainted with various properties of snow and the use of a thermometer before the field trip. The first two worksheets are to be used at the school. When measuring the temperature in snow or at the soil surface, dig a hole down and then slide the butt end of the thermometer into the snow at that level. In hard snow be careful, thermometers break easily. In class go over wind chill and the wind chill chart. You could plot the temperature, wind speed and wind chill together from the weatherman for a week or so. At Fallen Timbers divide the class into teams. Assign each team an area to study. Each team take the temperatures as listed on the data sheet.

As a group go over the temperature readings in the various areas. Discuss why or why not there were any temperature differences. Then answer the rest of the questions. This activity works best on extreme days, either hot or cold.

An alternative at school is to take Worksheet #2 and do it for a variety of temperatures and compare.

Snug As a Bug in a Rug

Worksheet #1

Snow and ice are very important in this region as insulators against temperature extremes. All temperatures outside are not the same as you will discover on the field trip.

Snow is a good insulator. Heat becomes trapped in all the air spaces between the water crystals. A blanket of snow is a "warm blanket". A layer of snow covering the ground will keep the soil temperature fairly constant during the winter. Answer the following questions. You may have to do some research to find the answers.

1. What is snow? ______
2. What is snow made of? ______
3. What is ice? ______
4. Why is ice different from snow? ______

   ______
5. What is the room temperature? Record all temperatures in both Celsius and Fahrenheit.

   C° ______ F° ______
6. Write the rule for changing a centigrade reading to Fahrenheit.

   ______

   ______
7. It is 0°C. Use the rule to show how you get 32°F.

   ______

   ______
8. Write the rule for changing a Fahrenheit reading to Celsius.

   ______

   ______
9. It is 68°F in our classroom. Use the rule to show me what temperature it is on the Celsius scale.

   ______

   ______

Snug As a Bug in a Rug

Worksheet #2

Investigate and write down the temperatures:

	Celsius	Fahrenheit	
1.	________	________	Top of snow
2.	________	________	Middle of snow
3.	________	________	Bottom of snow
4.	________	________	Snow - Ice surface
5.	________	________	Grass not covered with snow
6.	________	________	Grass covered by snow
7.	________	________	Blacktop
8.	________	________	Soil temperature next to building
9.	________	________	Soil temperature 2 dm. from building
10.	________	________	Soil temperature 4 dm. from building
11.	________	________	Soil temperature 10 dm. from building
12.	________	________	Soil temperature 20 dm. from building
13.	________	________	Soil temperature 40 dm. from building

WIND CHILL CHART

Estimated wind speed in m.p.h.	Actual Temperature Reading (F)										
	50	40	30	20	10	0	-10	-20	-30	-40	
calm	50	40	30	20	10	0	-10	-20	-30	-40	-50
5 mph	48	37	27	16	6	-5	-15	-26	-36	-47	-57
10 mph	40	28	16	4	-9	-21	-33	-48	-58	-70	-83
15 mph	36	22	9	-5	-11	-36	-45	-58	-72	-85	-99
20 mph	32	18	4	-10	-25	-39	-53	-67	-87	-96	-110
25 mph	30	16	0	-15	-29	-44	-57	-74	-90	-104	-118
30 mph	28	13	-2	-18	-33	-46	-63	-79	-94	-109	-125
35 mph	27	11	-4	-20	-35	-47	-67	-82	-98	-113	-129
40 mph	26	10	-5	-21	-37	-53	-69	-85	-100	-116	-132

Wind speeds greater than 40 mph have little additional effect	LITTLE DANGER (for properly clothed persons)	INCREASED DANGER	GREAT DANGER

Snug As a Bug in a Rug

Worksheet #3

Team Members ______________________ ______________________

______________________ ______________________

Work in teams of four. Each team will measure the temperatures of one region near the cabin. The areas to be studied are the field, a bushy area, a wooded area, the pond, and near the cabin. All temperatures will be measured in both Celsius and Fahrenheit.

Area Studied ______________________

Each team will take the following readings: Always leave the thermometer two minutes before take a reading.

	Celsius	Fahrenheit
1. Air in shade	______	______
2. Air in sun	______	______
3. Top of snow	______	______
4. Middle of snow	______	______
5. Bottom of snow	______	______

Measure the temperatures of the following if possible in your study area.

1. Surface of ice	______	______
2. Where snow and ice meet	______	______
3. In ice	______	______
4. In tree bark	______	______
5. In grass not covered by snow	______	______
6. In grass covered by snow	______	______
7. Rabbit hole	______	______
8. Bird nest	______	______
9. Other ____________	______	______
____________	______	______

Snug As a Bug in a Rug

Worksheet #3 (Cont.)

Where was the warmest spot? ____________________

Where was the coldest spot? ____________________

Why is the temperature different in different places?

Where would you live if you were a rabbit?, a mouse? Why?

What is a wind chill?

What was the wind chill today?

If you were a woodpecker in winter on which side of the tree would you look for insects? Why?

Environmental Activities Training Project
Fallen Timbers Consortium Schools
1927 Main Street, Green Bay, WI 54301

Reprint:
Project I-C-E RMC
1927 Main Street
Green Bay, Wisconsin 54301

Environmental Field Activity: They Got Me Coming and Going

Recommended Grades: Seasons: 5-8 All

Author(s): Steven Dannow

St. Boniface, DePere

Concept(s):
7. Land Use
10. Economic Gain/Loss

Integrated with:
Mathematics
Social Studies

Objective(s):

Dependent upon point of origin, students will chart trip route to the Fallen Timbers Environmental Center on the map insert, calculate mileage, and perform other activities as called for on the worksheet provided.

Rationale:

This is an exercise in orienteering to develop skills in map use, observing points and route along the way, and use of a compass to map points at the site. When someone else is driving on spaceship earth, we often are passive passengers, and if asked to retrace our steps, we are lost. We need to develop skills of quick observation and taking mental notes on specifics by looking for unusual landmarks, whether natural or man-made, in such way that we can readily recall them another time.

Directions:

While the map insert does not contain all possible roads or streets you may use to travel from your school to Fallen Timbers, the major roads are indicated. The Fallen Timbers Center is on County PP and is indicated by the blank circle.

As you travel from your school to Fallen Timbers, put a "X" on the map for your starting point. Trace your route to Fallen Timbers with pen or pencil (of another color, if available), and mark any roads not included on the map.

A. Along the way, make the following notations:

1. Name of street, road, etc. from which you started ______________________

2. Name other streets, roads used to main US, State or County highways to Fallen Timbers and any major landmark on each.
   a) Street/Road: ______________________
   b) Landmark: ______________________

a) Street/Road:____________________

b) Landmark:____________________

a) Street/Road:____________________

b) Landmark:____________________

a) Street/Road:____________________

b) Landmark:____________________

a) Street/Road:____________________

b) Landmark:____________________

a) Street/Road:____________________

b) Landmark:____________________

3. List here names of any towns, villages, unincorporated communities along the way.

a)____________________

b)____________________

c)____________________

4. On the way, note anything that strikes you as especially beautiful; upon arrival, write a brief description here:

5. Also, as above, note and describe something ugly, polluted, in poor taste:

6. Using the map legend, how many legend items did you encounter enroute. Name them.

a)____________________

b)____________________

c)____________________

d) ______________________________

e) ______________________________

7. Using the map scale and a ruler, compute the approximate distance traveled to Fallen Timbers. ______________________________

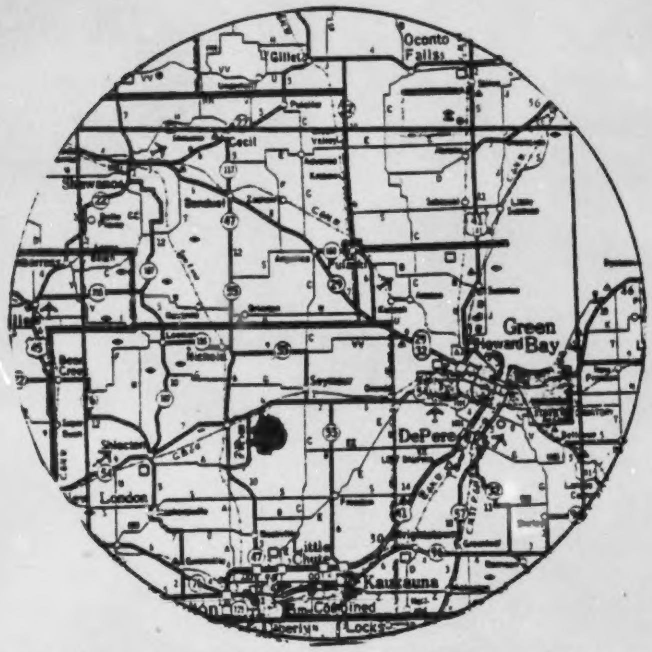
8. Ask the driver about the miles per gallon (MPG) performance of his bus (or car) and compute on the basis of a round trip, how many gallons were used and cost.

a) Miles ÷ MPG = Gallons

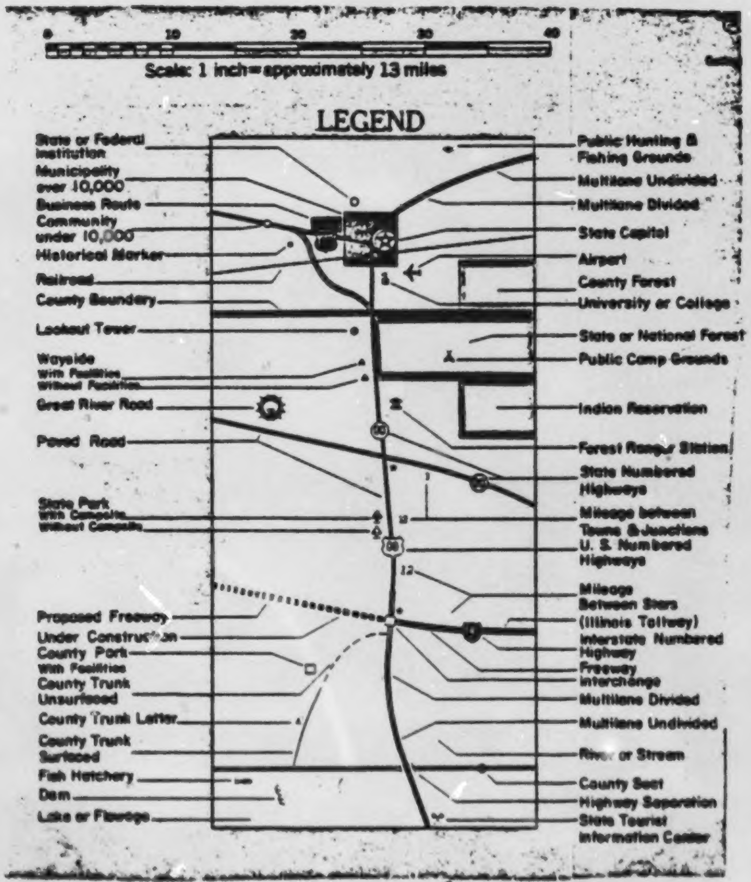
GAL ______________________________

b) Gallons x 60¢ = Cost

(Cost) ______________________________



Oconto Falls
Gillett
Cecil
Shawano
Green Bay
Howard
DePere
Seymour
London
Little Chute
Kaukauna
Combined Locks
Kimberly



0
10
20
30
40
Scale: 1 inch=approximately 13 miles
LEGEND
State or Federal Institution
Municipality over 10,000
Business Route
Community under 10,000
Historical Marker
Railroad
County Boundary
Lookout Tower
Wayside With Facilities Without Facilities
Great River Road
Paved Road
State Park With Campsite Without Campsite
Proposed Freeway
Under Construction
County Park With Facilities
County Trunk Unsurfaced
County Trunk Letter
County Trunk Surfaced
Fish Hatchery
Dam
Lake or Flowage
Public Hunting & Fishing Grounds
Multilane Undivided
Multilane Divided
State Capitol
Airport
County Forest
University or College
State or National Forest
Public Camp Grounds
Indian Reservation
Forest Ranger Station
State Numbered Highways
Mileage between Towns & Junctions
U. S. Numbered Highways
Mileage Between Stars (Illinois Tollway)
Interstate Numbered Highway
Freeway Interchange
Multilane Divided
Multilane Undivided
River or Stream
County Seat
Highway Separation
State Tourist Information Center

Environmental Activities Training Project
Fallen Timbers Consortium Schools
1927 Main Street, Green Bay, WI 54301

Reprint:
Project I-C-E RMC
1927 Main Street
Green Bay, Wisconsin 54301

Title: Bird Nest Soup

Recommended Grades: Seasons: 5-8 Fall, Early Spring

Author: Sue Simon

Adapted from MINE Publications, "Birds", Examining Your Environment.

Concepts:	Integrated with:
2. Ecosystem	Science
3. Carrying capacity	Math

Objectives:

Students will correctly identify nests as observed in a given natural area, using the information provided, and record their observations as called for in the suggested activities.

Directions:

Divide the class into teams of four. Assign students to roles of leader, recorder, ornethologist (in charge of books or keys) and research scientist (measures the nests). Have the entire class follow a particular trail to help keep control over the activity. Each team is then responsible for locating as many nests as possible.

The teams do not have to stick right next to each other but should be in the same general area. As they locate nests they should do the appropriate exercises. Read through the data sheet and explain the use of instruments and keys before you start the exercise.

The second part of exercise #4 is to be done as an entire class. Measurements from all the groups should be put on the charts. Answer the questions as a class.

For more activities and information see MINE Publication "Birds", Examining Your Environment (available I-C-E RMC). This activity complements with Fallen Timbers field activities: "At Home in the Sky" and "Is Man's Environment for the Birds".

Bird Nest Soup

Team Members: Leader ______________ Ornithologist ______________

Recorder ______________ Research Scientist ______________

From the nests we can learn a lot about their inhabitants. We can learn about bird habits, nesting territories, materials used in nests and about eggs and mating habits.

It's easiest to study nests when the leaves are off the trees. It's surprising to see the number of nests which hid in the summer foliage. We will not collect any nests, in Wisconsin it's against DNR laws to collect or possess nests without a special permit.

Activity #1

Take a survey of where nests are found. Especially of interest here is finding out if birds have their nests on a particular side of the tree.

Stand next to the trunk of a tree, facing the nest. Use a compass to find out which direction the nest is in. Point the base of the compass towards the nest. Line up the red end of the floating arrow with the red cross-hatched arrow. Read the direction the nest is in on the compass where it says 'read bearing here'.

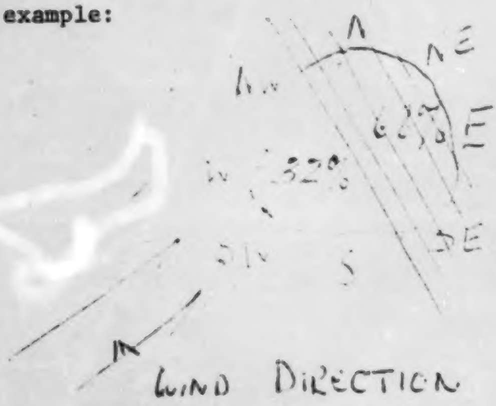
Write down the direction on a data sheet. For example:

Data Sheet for Nest Survey

No.	N	NE	E	SE	S	SW	W	NW
1	✓							
2		✓						
3			✓					
4		✓						

Display your data in a picture graph, include the wind direction.

For example:



Activity #2 (to be done at the same time as Activity #1)

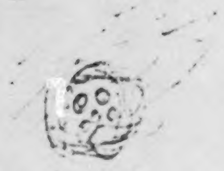
For each nest seen in Activity #1, determine the height from the ground. Use a hypsometer or a clinometer to determine the height. Your leader will explain how to use the instruments.

Activity #3 (to be done at the same time as Activities #1 and #2)

1. Nests come in all shapes and sizes. The nest may lie flat on the ground or it may be wedged between two branches or may hang like a pendulum from a branch.

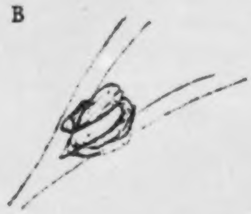
   Classify each nest you find as one of the following:

A



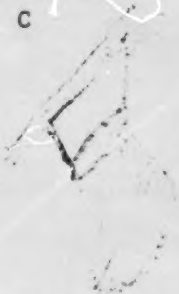
NEST ON GROUND

B



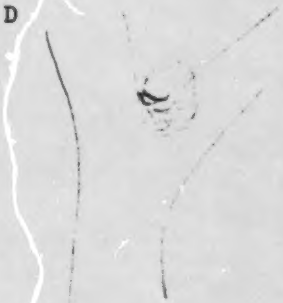
NEST IN FORK OF TWO BRANCHES

C



HANGING NEST

D



NEST CUPPED ON ONE BRANCH

   Put a check for each nest found.

   A. Nest on ground

   B. Nest in fork

   C. Hanging nest

   D. Cupped Nest

2. What might be the advantage of one type of nest over another?

3. Name three reasons why you can't find more nests.

   1.

   2.

   3.

Activity #4

1. Find one or two nests which you can observe carefully without harming it. Do the following measurements and answer the questions.
a=Inches b=Millimeters

	Yours		Others							
	1a*	1b*	2a	2b	3a	3b	4a	4b	5a	5b
Depth of cup										
Outside diameter										
Inside diameter										
Circumference										
Other										

2. Add to your chart the measurements from other groups.

3. What was the difference in outside diameter from the largest nest to the smallest? __________

4. What was the difference in inside diameter from the largest nest to the smallest? __________

5. Why do you think there was a difference in size?

6. Why wasn't there a greater difference?

7. If you have a key to bird nests try to identify your nest.

Activity #5

1. Take a close look at the nest you found in Activity #4. What materials was the nest made from?

2. Collect the same materials from the area. Make separate piles for each different material.

3. Now for the challenge, use those materials to try to build your own nest. If you are successful you may take that nest home.

4. Compare your list of materials with other groups. Do all bird nests contain the same type material? ___________

5. How do they differ?

6. Were the materials found on the outside of the nest the same as those found on the inside? __________

7. What is one main reason birds build nests?

8. Name four things a bird would need to successfully lay eggs and raise its young.

   1.

   2.

   3.

   4.

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Reprint:
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Title: It's Anybody's Guess

Recommended Grades: Seasons: 5-8 All

Author: Robert Fischer

Dickinson, DePere

Concepts:
6. Natural resources
5. Clean Air
9. Change

Integrated with:
Earth Science
Science

Objectives:

With the basic information supplied and with the use of special charts, students will complete the activities and record basic information, correctly identifying different cloud types and making weather predictions.

Directions:

Inclass Preparation: Because of the complicated factors which go into weather forecasting, be sure to go over the following information with the students. The discussion of the material is only cursory; any additional written material or audio-visual materials would be helpful. Duplicate the wind velocity and barometric pressure charts. Explain their purpose in class and then bring along for use in predicting the weather.

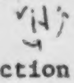
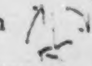
What Causes Weather

Weather is caused by a combination of many factors. All weather phenomena such as wind and storms, clouds, rain and snow are the result of two basic occurrences; the constant radiation energy from the sun and the 24-hour rotation of the earth along with the 12-month orbit around the sun.

Local weather conditions depend on the specific circumstances in that area. The makeup of the air can affect the weather. Humidity is a measure of the amount of water vapor found in the air. In desert areas the amount of water vapor is very low and in rain forests the humidity may be so high that it mists continuously. The amount of water vapor in the air can be measured with an instrument called a sling psychrometer. The psychrometer consists of two thermometers. One measures the true air temperature. The other thermometer is covered with a piece of cloth which is dipped in water. This thermometer will show a lowered temperature based on cooling caused by evaporation of the water. The two thermometers are mounted on a board with a chain attached. The psychrometer is swung around for a specific time period. The two temperatures are read and from the chart in the weather station the relative humidity is found.

The amount of water vapor air can contain before precipitation occurs depends on the temperature. The higher the temperature the more water which can be held in the sky. Thus, if you have a high temperature during the day and humidity of 50% you probably wouldn't get any rain or fog. If at night the temperature cools the air can't hold the water as well so the humidity could change to 100% and dew, fog or drizzling might occur.

The air containing the water vapor is moving most of the time. This air movement or wind is caused by differences in air temperature and air pressure. We can measure the wind speed with an instrument called an anemometer. A sudden change in wind speed or direction often means a change in weather. (See wind charts)

Air has weight which can change depending on the density or thickness of the air. We call this weight the air pressure. The air pressure is measured in inches on an instrument called a barometer. If you have watched the weatherman on TV you have probably noticed the highs and lows written on the weather map. The highs are areas with high pressure and usually mean fair weather. Highs have winds which circulate in a clockwise manner  . A low is an area with low pressure and usually means cloudy weather. Lows have winds which circulate in a counter-clockwise direction  . Where highs and lows meet there is a change in wind direction, a change in temperature and a change in weather. A CHANGE IN AIR PRESSURE indicates A CHANGE IN WEATHER. (See barometer pressure chart) A change in temperature causes water vapor to form into visible water droplets called clouds.

Clouds are formed by the air temperature and water vapor content at different levels in the atmosphere. Clouds affect the earth in two ways:

1. They absorb energy from the sun.

2. They reflect heat energy from the earth back down, acting like a blanket to help keep the earth warm. This is especially true at night.

The name of a cloud may describe the appearance and the altitude in which they were formed.

The term strato means layer-like; stratus clouds are thin, layered clouds and are a sign of fair weather.

The term cumulo means pile or help; cumulus clouds usually are rain clouds.

The term cirro means curl; cirrus clouds usually indicate a change to rainy weather.

The term nimbo means rain; nimbus clouds are rain clouds.

To visualize the basic cloud types and the many variations, cloud charts should be used. Fallen Timbers has cloud charts for use on site.

From all the above information and the measurements you will make at Fallen Timbers, you should be able to predict the weather.

After the Field Trip:

1. Meteorologists use more sophisticated instruments and measurements. Find out how the weatherman predicts the weather and what else could influence local weather. It may be possible to get a local meteorologist in to talk to the class.

2. Find out about local measures to change the weather.

3. Have local measures to change the weather been successful?

4. Do you think we should change weather if we have the ability to do so? Why or why not?

5. Why would man want to change the weather?

6. How does pollution in the air affect weather?

7. How does pollution in the air affect the rain and the ground where the rain falls?

ESTIMATING WIND VELOCITY

Name ______________________________

Less than 1	Calm, smoke rises vertically
1 - 3 (Light)	Direction shown by smoke
4 - 7	Wind felt on face: Leaves rustle
8 - 12 (Gentle)	Leaves and small twigs in motion: wind extends flag
13 - 18 (Moderate)	Wind raises dust and loose paper: small branches move
19 - 24 (Fresh)	Small trees in leaf begin to sway: wavelets appear on waters
25 - 31 (Strong)	Large branches move: whole trees sway, walking difficult
39 - 46 (Gale)	Twigs break off
47 - 54	Roof slats blown off
55 - 63 (Whole Gale)	Trees uprooted
64 - 72	Widespread damage

FORECASTING BAROMETRIC PRESSURE

Rising ↑

Steady →

Falling ↓

Rising barometer - Fair weather
Falling barometer - Stormy weather

Wind Direction		Barometer		Kind of Weather
SW - NW		30.10-30.20	→	Fair with little temp. change for 1-2 days
SW - NW	(Fast)	30.10-30.20	↑	Fair - Rain in 2 days
SW - NW		30.20	→	Fair and little temperature change
SW - NW		30.20		Slowly rising temperature-Fair for 2 days
S - SE		30.10-30.20	↓	Rain within 24 hours
S - SE	(Fast)	30.10-30.20	↓	Wind rising in force - Rain in 12-24 hours
E - NE	(Slow)	30.10-30.20	↓	Light winds - no rain likely
E - NE	(Fast)	30.10	↓	Rain within 24 hours
SE - NE	(Slow)	30.00 or less	↓	Steady rain for 1-2 days
SE - NE	(Fast)	30.00	↓	Rain and high wind, clearing within 36 hours
S - SW	(Slow)	30.00 or less	↑	Clearing in a few hours, fair for several days
S - E	(Fast)	29.80	↓	Bad storm, clearing in 24 hours
E - N	(Fast)	29.80	↓	Gale and cold wave
Going W	(Fast)	29.80	↑	Clearing and colder

Forecasting Worksheet

1. Type of clouds ______________________________

2. General meaning of cloud type ______________________________

3. Wind velocity estimated from chart ______________________________

4. Wind velocity from anemometer ______________________________

5. Wind direction ______________________________

6. Barometer reading ______________________________

7. Is the barometer rising, steady or falling? ______________________________

8. From chart, the expected outcome of barometric pressure.

____

____

9. Use the wet-dry bulb thermometer to determine the relative humidity.

____

10. What was the high and low temperature reading for the past 24 hours?

High ______________ Low ______________

11. What is the present temperature? ______________________________

12. What is your weather forecast? Why?

____

____

____

____

____

13. (After 24 hours) What was the weather really like?

____

____

____

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Reprint:
Project I-C-E RMC
1927 Main Street
Green Bay, Wisconsin 54301

Title: 3 □ △ ↓ ⊜ or In Every Life a Little Rain Must Fall

Recommended Grades: 5-12
Seasons: All

Author: (adapted from) John Jaesche
Madison, Wisconsin

Concepts:
2. Ecosystem

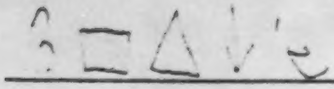
Integrated with:
Language Arts
Social Studies

Objectives:

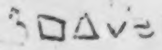
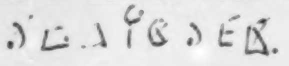
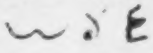
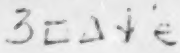
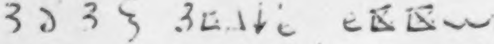
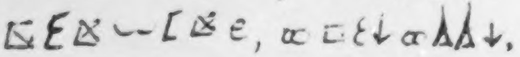
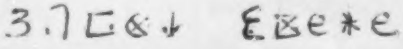
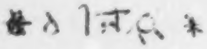
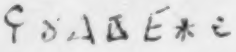
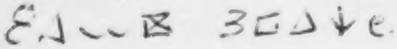
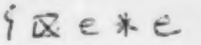
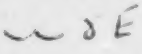
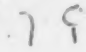
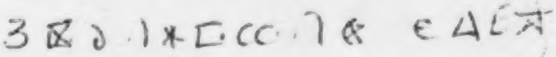
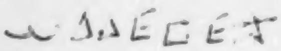
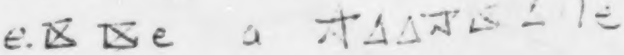
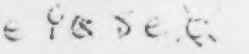
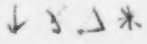
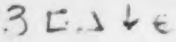
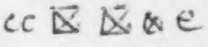
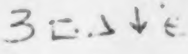
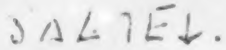
While learning something about a bird's life, students figure out a symbolic code in a language experience, sharing such with each other.

Directions:

This is a short rainy day activity on birds (3 □ △ ↓ ⊜). Give each student a blank sheet of paper and a copy of the riddle. They are not to write on the riddle itself. In lower grades students might need to work in teams. Set a time limit of about 15 minutes. When time is up check to see how many correctly finished. Then have the students individually or in pairs develop their own codes and stories. Trade stories and work them out or one at a time write them on a blackboard and the whole class figures them out.

 Name ____________________

As you read, you will be able to tell what letter each symbol represents. When you see that symbol again, it will represent the same letter. Translate all the symbols into words.

 have always attracted man by their beautiful colors and songs, and especially by their ability to fly so gracefully. For many years, man worked hard to imitate their flight, and after many failures, finally invented the   is also amazed by a  instinct.  to know how to avoid their , and  without being  by their . Of course,  are , but when  wakes  to a  in the  or   of color  across the sky, he the  he doesn't like and  that  are worth having 

DO NOT WRITE ON THIS SHEET!

Environmental Activities Training Project
Fallen Timbers Consortium Schools
1927 Main Street, Green Bay, WI 54301

Reprint:
Project I-C-E RMC
1927 Main Street
Green Bay, Wisconsin 54301

Title: At Home in the Sky

Recommended Grades: Seasons: 5-12 All, spring best

Authors: Suzanne Simon

Margaret Hoogland

Westwood, W. DePere

(Adapted from MINE Publications, Birds, and Audubon Bird Study Program)

Disciplines:
Science
Language Arts
Art

Concepts:
2. Ecosystem
3. Carrying Capacity

Equipment: Binoculars, one for each student
Clipboards, pencils and bird field guides

Behavioral Objectives:

The students will observe and identify characteristics of birds and bird behavior leading to the identification of the bird by recording bird behavior and describing this behavior in their own words.

Rationale/Directions:

This activity is designed to get the students actively involved in observing birds in a natural environment. Hopefully, the students will not just learn specifically about birds but will also better understand and appreciate them.

For this exercise to work, the students must first learn about birds in the classroom. The MINE publication, Birds, (available from Project I-C-E) has some excellent in-school activities. Also teach the students how to use the field guides for identifying birds. Go over such terms as eye rings, bill shapes, wing bars, flight patterns, etc.

Divide the class into teams. Assign one student as team leader. If you have enough field guides and binoculars this exercise can be done individually.

Other activities involving birds can be found in Audubon Aids; Bird Study Program, Project I-C-E activity "Is Man's Environment for the Birds?", and Fallen Timbers Activity Series "Avian Architects".

At Home in the Sky

Student Directions

Work in teams.

Names: ______________________ ______________________

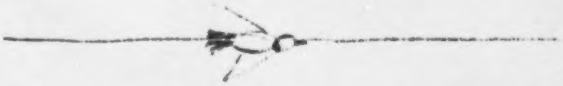
______________________ ______________________

Each team will need a bird identification guide. Each student should have a pair of binoculars.

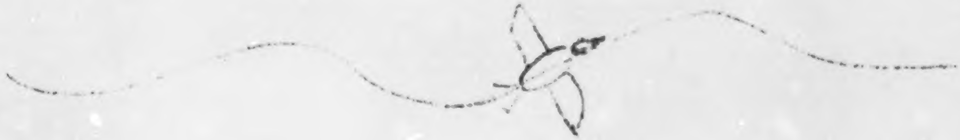
1. Quietly walk along the trails until you find a bird you wish to study. Try to answer as many of the questions on your data sheet as possible. Some birds are easier to watch than others. If your bird flies away, look for another. The quieter you are the more success you will have.

2. Sudden or quick movements will frighten a bird and make it take off. The distance a bird will let you get before it flies is its 'fright distance'. To measure this fright distance, watch a bird and try to identify it. Slowly move closer to it. When the bird flies, stop. Then walk to where the bird was, counting each step. Write the number of steps on your data sheet.

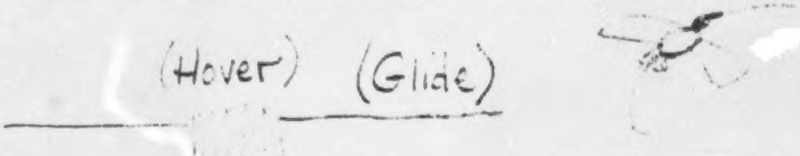
3. Watch the bird as it flies. Different birds have different 'flight patterns'. A flight pattern is the path a bird flies through the air. Some birds fly in a straight line.



Other birds have a wavy flight pattern.



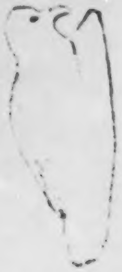
Still other birds hover and glide or soar in large circles.



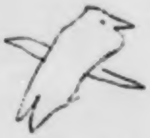
Record the flight pattern on your data sheet by drawing a line. Below the line (of the flight pattern) use an adjective to describe the flight (bouncy, swift, irregular, zigzagging, circling, soaring, jerky, etc.)

4. Describe the motion of the wing beat. Use words like: rapid, slow, steady, strong, deep, long, hovering. For example, Hawk - easy, soaring beats.

5. If you can, try to make a quick sketch of the bird's outline as it is sitting.



Woodpecker



Barn Swallow

DATA SHEET

	Bird #	1	2	3	4	5	6
	Name	Hairy Woodpecker					
Size	Crow						
	Robin	X					
	Sparrow						
Color Of	Tail						
	Rump						
	Back						
	Breast						
	Wing						
	Throat						
	Crown						
	Special Markings*						
	Type of Bill						
	Fright Distance	[illegible]					
	Flight Pattern	– – – –					
	Flight Pattern Description	Bouncy, erratic					
	Wing Beat Description	Short choppy [illegible]					
	Bird Outline						
	Habitat Type						

* Special markings include: wing bars, eye rings, patches of color, tufts or crests

1. Which birds were most common?

2. In what type of areas did you see the most birds?

3. If all of Fallen Timbers was a large lake, what would be different about the types of birds seen? Why?

4. What would happen to the birds if a specific habitat type was destroyed?

5. Why are certain birds only found in certain areas? (Like the woodpecker is only found in forests.)

6. How do different bill types help the birds live in their habitats?

Back in School

1. Plant sunflower seeds. Plant early in spring when the earth is warm. Water and thin according to package directions. When flowers appear watch for bumblebees helping to pollinate the flowers. As the seeds dry, birds and other animals will eat them. Save some for use in winter bird feeders.

2. Build a bird house. Below is a guide to three popular bird houses.

Type Bird	Entrance Diameter	Entrance From Floor	Floor Cavity	Cavity Depth	Where to Place Birdhouse	Bird found in Breeding Season
House Wren	7/8"	1" - 6"	4" x 4"	6" - 8"	Hung from limb; 6'-10' from ground	Upper half of U.S.
Blue Bird	1-1/2"	6"	5" x 5"	8" Cut hole in top 3" across with screen	On post or tree in or near open field, 5'-6' from ground	Eastern half and Western third of U.S.
Chick-adee	1-1/8"	6" - 8"	4" x 4"	8" - 10"	Hung from a limb 6'-15' from ground	Over much of U.S. except part of south central and south west

3. Build a bird feeder. You can make a shelf style one out of wood. A suet hanger can be made by drilling one inch holes into a branch, stuffing with suet and hung from a tree.

4. At Christmas time, decorate a wildlife tree. Make garland out of popcorn and cranberries. Stuff large pine cones with peanut butter and roll in bird seed. Make up a batch of suet cakes: Mix equal parts of melted beef suet and sugar syrup (3 parts water and 1 part sugar boiled together). When still soft, add nuts, seeds or bread crumbs. Form into balls, chill and hang with string. Hang apple, carrot, and Indian corn shocks.

Environmental Activities Training Project
Fallen Timbers Consortium Schools
1927 Main Street, Green Bay, WI 54301

Reprint:
Project I-C-E RMC
1927 Main Street
Green Bay, Wisconsin 54301

Title: Succession at the Forest Edge

Recommended Grades: Seasons: 6-8 Summer, Fall

Authors/Editors: Dave Engleson
George Howlett, Jr.

Adapted from Wisconsin Environmental Education Inservice Project

Concepts:
2. Ecosystem
3. Carrying Capacity

Integrated with:
Science
Mathematics
Social Studies

Objectives:

Students will determine the change in plant type composition along a gradient at a woodland edge by sampling plant composition with the quadrant method.

Rationale:

Living communities undergo change. There is a directional change readily observed at locations where one community type replaces another type. This directional change, called succession, can easily be observed and measured at the edge of a meadow/forest boundary as the forest invades the meadow.

Equipment:

String and stakes, metric tapes, meter sticks, trowels, wind meters, soil and air thermometers, sling psychrometer, blank paper, study sheets, clipboards, pencils

Teacher Background:

The interaction of living things with each other and their physical environment over time results in changes. All natural habitats undergo such change. Within a woodland the absence of young trees of the same species as older trees, and the presence of young trees of a different species suggests that some changes are taking place in the community.

Changes may be even more apparent at the edge of a woodland. This exercise studies these changes by observing the plants along a line (transect) running from within the woodland to a field outside the woodland, and the physical conditions occurring along this line. Data gathered through this process is used to infer reasons for the changes.

It is not necessary that the student be able to identify all the plant species which might occur along the transect line. The concept of succession can be advanced if the student merely identifies trees, shrubs, herbs and grasses. If the student can identify tree, shrub, herb and grass types all the better, but such knowledge is not prerequisite to successfully completing the encounter.

Skills of measurement, record keeping, and information display may be furthered by this encounter. Thus it could be used effectively as either a mathematics or science exercise.

Field Station Activity:

1. Form class into teams of four. Two teams may work on same transect, working from opposite ends. Place strings from within woodland running to open meadow. Keep straight lines. Locate transects five meters apart.

2. At the transect end mark off a square meter plot. Record information for that plot as requested on following data sheet, two teams responsible for each transect.

3. Locate additional square meter plots at five meter intervals along transect and record data.

4. Note sign of animal activity along transect. Determine if animal activity affects plant succession.

5. Relative humidity may be recorded once for the class at locations in the meadow, within the forest edge and within the forest proper.

ONE METER SQUARE SAMPLE
Record data below

Transect # __________
Plot # __________

Plants (Record as: many, some, few, none)

_____ Trees
_____ Shrubs

_____ Herbs (non-woody, non-grass)
_____ Grass

Physical Conditions

_____ Light (bright, shady, dark)
_____ Soil temperature
_____ Surface temperature (air)
_____ Temperature at 1.5 m above surface

_____ Wind velocity
_____ Relative humidity
Soil information (dig soil samples)
____

ONE METER SQUARE SAMPLE
Record data below

Transect # __________
Plot # __________

Plants (Record as: many, some, few, none)

_____ Trees
_____ Shrubs

_____ Herbs (non-woody, non-grass)
_____ Grass

Physical Conditions

_____ Light (bright, shady, dark)
_____ Soil temperature
_____ Surface temperature (air)
_____ Temperature at 1.5 m above surface

_____ Wind velocity
_____ Relative humidity
Soil information (dig soil samples)
____

ONE METER SQUARE SAMPLE
Record data below

Transect # __________
Plot # __________

Plants (Record as: many, some, few, none)

_____ Trees
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_____ Herbs (non-woody, non-grass)
_____ Grass

Physical Conditions

_____ Light (bright, shady, dark)
_____ Soil temperature
_____ Surface temperature (air)
_____ Temperature at 1.5 m above surface

_____ Wind velocity
_____ Relative humidity
Soil information (dig soil samples)
____

ONE METER SQUARE SAMPLE Transect # __________
Record data below Plot # __________

Plants (Record as: many, some, few, none)

_____ Trees
_____ Shrubs
_____ Herbs (non-woody, non-grass)
_____ Grass

Physical Conditions

_____ Light (bright, shady, dark)
_____ Soil temperature
_____ Surface temperature (air)
_____ Temperature at 1.5 m above surface
_____ Wind velocity
_____ Relative humidity
Soil information (dig soil samples)
____

ONE METER SQUARE SAMPLE Transect # __________
Record data below Plot # __________

Plants (Record as: many, some, few, none)

_____ Trees
_____ Shrubs
_____ Herbs (non-woody, non-grass)
_____ Grass

Physical Conditions

_____ Light (bright, shady, dark)
_____ Soil temperature
_____ Surface temperature (air)
_____ Temperature at 1.5 m above surface
_____ Wind velocity
_____ Relative humidity
Soil information (dig soil samples)
____

ONE METER SQUARE SAMPLE Transect # __________
Record data below Plot # __________

Plants (Record as: many, some, few, none)

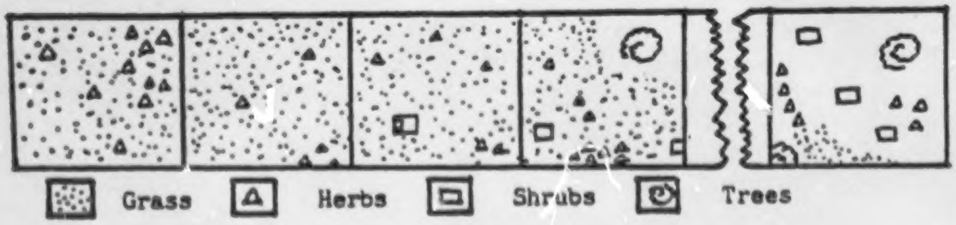
_____ Trees
_____ Shrubs
_____ Herbs (non-woody, non-grass)
_____ Grass

Physical Conditions

_____ Light (bright, shady, dark)
_____ Soil temperature
_____ Surface temperature (air)
_____ Temperature at 1.5 m above surface
_____ Wind velocity
_____ Relative humidity
Soil information (dig soil samples)
____

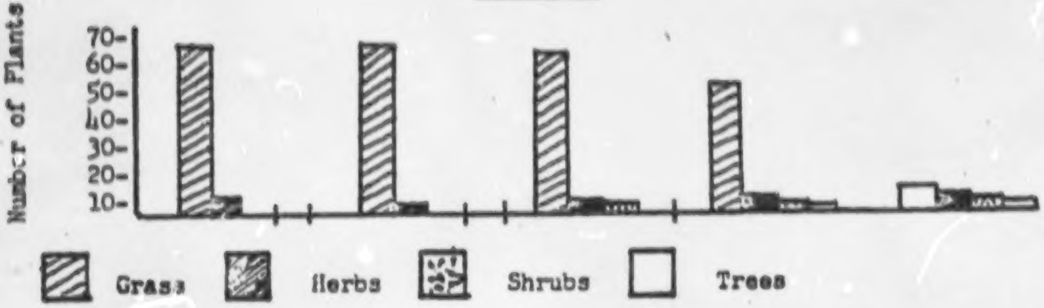
Follow up Activity

1. Compare the results of all teams. This may be done by developing a set of symbols for each of the four vegetation types and marking them on strips of paper (shelf paper, narrow butcher paper, wide adding machine tape) or on squares which can be mounted on a tackboard or chalkboard. An illustration of this technique follows.

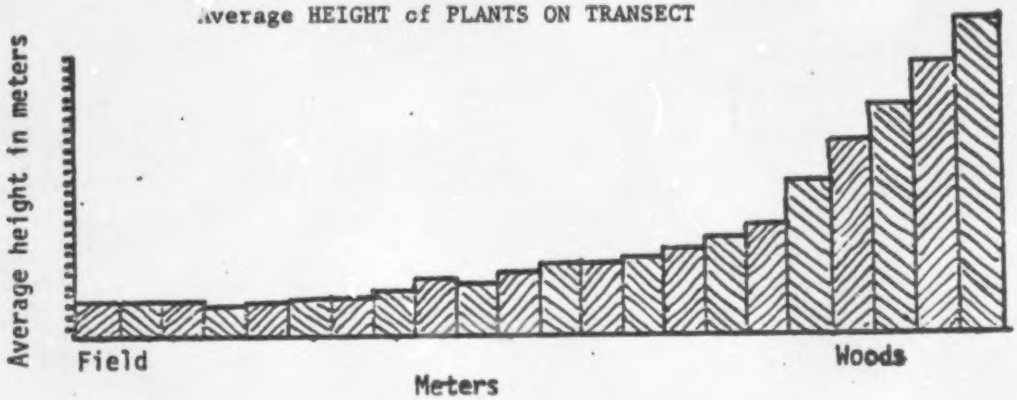


Histograms may also be used if numbers of plants are determined.

HISTOGRAM



Data may also be graphed as follows:



2. The students should interpret the data they have collected.

(Additional teacher note: The child's interpretations may not be correct from the adult point of view, but the fact that the child is making an independent approach to learning and is seeking his own answers is more important than specific content at this level.

This is not to say that the teacher must sit back and wait for a discovery. The structure within which the children operate will have a great effect on what they discover if they discover anything at all. If the maps and graphs from the transect are arranged on a bulletin board in the proper sequence, the students may then attempt to make the correlation between the areas measured by quadrants with areas along the transect. From this information students may make inferences about the relative ages of the various areas and ideally arrive at the concept of succession.

Reprint:
Project I-C-E RMC
1927 Main Street
Green Bay, WI 54301

Environmental Activities Training Project
Fallen Timbers Consortium Schools
1927 Main Street, Green Bay, WI 54301

Environmental Field Activity: World of the Wily Whitetail

Recommended Grades: 6-9

Author(s): (An Adaptation by:) Sister Raphael
St. Mary's, Greenleaf

Concept(s):

6. Natural resources
2. Ecosystem
3. Carrying capacity
9. Change
12. Stewardship

Integrated with:

Science
Social Studies
Agriculture
Language Arts

Objective(s):

Through a study of the habits and habitats of the whitetail deer, students will recognize, record, and describe signs that evidence the presence of these animals in suitable locations.

Background Information:

The whitetail deer is the primary big game animal in the United States. Its economic and aesthetic value is extremely high. Its beauty and natural instinct are greatly appreciated by hunters, photographers, conservationists and preservationists alike. It is a very common mammal in most parts of the United States and for the inquisitive student, becomes a very good study animal.

Although the whitetail deer is extremely wary, it is too large a mammal to live in any area and not leave its calling cards. A systematic study of the habits and habitats of the whitetail deer can give the student insight into the behavior of many wild mammals and birds.

We can observe some of the physical features of the deer by use of binoculars. If we want to do an anatomy study of the whitetail, we will have to rely on contributions from hunters.

Pre-Trip Activities:

From available library resources, have students investigate and discuss the following questions:

1. What is a deer?
2. What do deer eat?
3. Where do deer stay?
4. Do deer do any harm?
5. Do deer do any good?
6. What do deer hoofs look like?
7. How can we tell how old deer are?
8. What is velvet on deer horns?
9. How do deer rid themselves of this velvet?
10. What is a deer scrape?
11. What is the "rut" season in deer and where is it?

If available, introduce different anatomical features contributed by some local deer hunter. Include jawbones, antlers, a piece of hide with the hair attached, hoofs, scent glands, tail, etc.

Field Trip Directions:

The field trip should be taken to an area which has a fairly high concentration of deer. This will insure a successful field trip and will increase the chances of actually seeing a deer. Scrubs, marshy swamp forest, meadow, and corn fields are good choices, especially if several of these are in close proximity. Deer signs to be observed and charted include: tracks, beds, scrapes, damaged trees, browsing signs and actual sightings. October, November, and December are good months for this activity.

Warm clothes are a necessity because of possible extended periods of time in the field.

Materials:

1. Proper clothing
2. Binoculars
3. Cameras
4. Microscope or magnifying glass
5. Paper bags

Field Chart of Deer Signs/Sighting:

All signs should be charted. If cameras are available, pictures of deer signs can be taken and included in a scrapbook on deer habits and habitats. Signs of browsing can be collected to determine if they are made by deer or other mammals.

Tally the number of signs in any given area under investigation.

Kinds of Signs	Type of Area					
	Scrub Growth	Marsh	Swamp	Forest	Meadow	Cornfield
Browsing						
Scrape						
Tree damage						
Tracks						
Beds						
Droppings						
Sighting (if you are lucky!)						

Photograph of deer signs could be taken for inclass review. Browsing signs should be examined with a hand lens. Deer tear off branches and leave ragged ends. Rabbits nip branches cleanly.

Follow up questions for written description of observations:

1. Where were the deer? How could you tell they were there?

2. Were there many deer in the spot? How many do you think?

3. Why were they there? To sleep? For food? Hiding from man?

4. What did they eat? Was there much food?

5. How long will they stay in this area? Do they come back?

6. Are there signs of deer fighting? What do they fight?

7. Where do deer get water in this area?

8. What do deer tracks look like?

9. When do deer mate? How is a mate selected?

10. Did you find any antlers? Why might some be found?

11. If sighted, how did the deer react?

12. How fast and far can deer run?

Environmental Activities Training Project
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Reprint:
Project I-C-E RMC
1927 Main Street
Green Bay, Wisconsin 54301

Title: How Wet a Spring? or Will My Roof Come Tumbling Down?

Author: Suzanne Simon

Adapted from "Math With Snow" by Major L. Boddicker, Interlakes Environmental and Outdoor Education Program, Chester, South Dakota

Grade Level: 6-8

Season of use: Winter

Objectives:

1. The students will be able to calculate areas, percentages, volumes and averages.
2. The students will get a practical and positive experience with snow.

Rationale:

This activity is a good practical exercise in science and math. It gives the student a chance to work at problem solving techniques. The Bureau of Reclamation, Corp of Engineers and others do essentially the same type of projects to find out how much water will result from the spring thaw of snow. This way they can forecast floods.

Equipment:

15 meter sticks, 1 metric tape measure, 16 gallon jars, milk cartons, or large mouth jars, scale which measures grams.

Directions:

The students will be trying to find out several things about snow. Introduce the following questions prior to the field trip.

1. How much water is contained in the snow on the ground?

2. How much does snow weigh?

3. How could we find out?

Divide the students into teams of four. Assign one student to be the team leader.

At the site, measure a representative area; either a 5 meter, 10 meter, or 30 meter square (or any other size square or rectangle). This is the sample area and will represent the snowfall for the entire area.

Make paths through the square; students are to stay on the paths when walking in the square unless they need to take a measurement in an undisturbed portion.

Assign two teams to section A and two teams to section B.

How Wet A Spring?

Student Instructions

Team ______________ Section ______________

__________________________________ __________________________________

__________________________________ __________________________________

A.

1. Each student will take 10 depth readings at random spots within the area. To get a random sample, take a meter stick, close eyes and gently toss the meter stick into the square. Take a measurement of the depth of snow in the nearest undisturbed patch of snow.

   Be careful when walking in the square, stay on the paths.

		Student Numbers									
Sample Numbers	Example	1	2	3	4	5	6	7	8	9	10
1	30										
2	26										
3	50										
4	46										
5	35										
6	35										
7	10										
8	9										
9	23										
10	36										
Total	300cm										
Ave.	30cm										

Write answers in centimeters.

Figure out the volume of snow in the area. Convert all numbers to meters and multiply length, width and height. For example, if you used a 5 meter square with the above figures, the volume of snow would be:

5m x 5m x .30m = 7.5 cubic meters of snow

2. How much water is in the snow?

Each student should fill a container with snow. Don't pack it in, just scoop it up. Measure the height of the snow column in each container. Record the time it takes for the snow to melt. Measure the height of the water column. What percentage of snow is water? Figure it out by multiplying the water column height by 100 and dividing by the snow height.

Example: 2.5cm x 100 = 250cm

250cm ÷ 30cm = 8.3%

		Student Numbers									
	Ex.	1	2	3	4	5	6	7	8	9	10
Height of Snow Column	30cm										
Time for Snow to Melt	30min.										
Height of Water Column	2.5cm										
Percentage of Water in Snow	8.3%										

Average percentage __________

Average all percentages. Why did the percentages differ?

Why did it take longer for some of the snow to melt?

B. Snow Melt Runoff

1. Each student takes a liter jug and measures out 1 cubic decimeter (1/10 meter) of snow. Some students should take the snow from the surface and others should take the snow from various depths from the surface to the ground. Stuff the snow into the jar and bring it into a building to melt. After it melts, measure the amount of water in each cubic decimeter of snow. Average the amount of water yielded by adding all the amounts of water together and dividing by the number of samples. Save the water.

Student Numbers

	Example	1	2	3	4	5	6	7	8	9	10	Total	Average
Amount of Water in 1 cubic decimeter of snow	960ml .96l												

Average depth found by Section A __________

Find out the amount of water in one cubic meter of snow. Do this by multiplying the amount of water found in one decimeter of snow by 10. To find the total amount of water in the area, multiply the total amount of snow times the amount of water in one cubic meter.

Example: 5 meters x 5 meters x .30 meters = 7.5 cubic meters of snow

1 cubic decimeter = .96 liters

1 cubic meter = .96 liters x 10 = 9.6 liters

Liters of water in 7.5 cubic meters of snow = 7.5 x 9.6 = 72

How many liters of water would be on one acre of land? __________

2. How much does the snow weigh? Weigh the melted snow from section B. 1.

Student Numbers

	Example	1	2	3	4	5	6	7	8	9	10	Total	Average
Weight of .10 cubic meters of snow	450 grams												

Find the average weight of snow for the area.

Example: .10 cubic meters of snow = 450 grams

1 cubic meter = 450 x 10 = 4,500 grams

25 cubic meters of snow = 25 x 4,500 = 112,500 grams

How much does the snow on the roof weigh? __________

Environmental Activities Training Project
Fallen Timbers Consortium Schools
1927 Main Street, Green Bay, WI 54301

Reprint:
Project I-C-E RMC
1927 Main Street
Green Bay, Wisconsin 54301

Title: Name the Trees

Recommended Grades: 6-12 Seasons: All

Author: George Howlett, Jr.

Disciplines:
Science

Concepts:
2. Ecosystem

Objectives:

Students will practice identification processes by direct contact with woody members of a biotic community.

Equipment:

Provide the following for each team; a pencil, a copy of this exercise, clipboard or cardboard. A copy of Forest Trees of Wisconsin by F. G. Wilson will be provided by the environmental center.

Directions:

Wear clothing appropriate to the season. Waterproof boots will be needed during wet seasons. Form students into teams of 3-4.

Inclass preparation should include an examination of field characteristics of trees native to the study area (see tree species list). Use branch samples if possible. Explain identification terms such as opposite and alternate branching, compound and simple leaves, pith, deciduous, etc. Have students observe trees in the school yard or along the street for variation in characteristics. Study characteristics of local trees by consulting tree manuals such as Forest Trees of Wisconsin by F. G. Wilson (DNR publication).

Inclass followup should include an IMC investigation into the commercial uses of the various tree species. Students should discover the ecological site requirements for each species. A good source is the Natural History of Trees of Eastern North America by Peattie.

Each team will independently circulate in a tree identification area. As a team, students will discuss with each other the identity of each marked tree after observing the tree characteristics and matching these with listed characteristics.

Students should write down the field characters which most influenced them to decide upon each identity. Students should also observe and write a description of environmental site characteristics as suggested for each study area.

Time restraints may prevent you from doing all three areas. Any one or combination of two may be done.

Location of identification areas:

Trees #I - #VII: Aspen Circle Trail

Trees #VIII - XIV: Deep Forest Trail beyond junction with Aspen Circle Trail

Trees #N-1 - #N-10: Cedars Trail (North Forest Unit)

Tree species present in identification areas:

Tamarack, trembling aspen, cottonwood, peach-leaf willow, butternut, red maple, American elm, white birch, yellow birch, green ash, black cherry, box elder, tag alder, silver maple, hemlock, white cedar, white pine, big tooth aspen, bur oak, white spruce, blach ash, sugar maple, apple, basswood, swamp white oak, balsam poplar, choke cherry, sandbar willow, red oak.

NAME THE TREES - Matching Exercise

Aspen Circle Area

A. From the tree descriptions given below, select the ones most appropriate and write them in the proper blanks along with the clue which most helped identify each tree. Several trees described are not marked. Please read description and compare tree feature carefully.

I. ________________ Clue ________________

II. ________________ Clue ________________

III. ________________ Clue ________________

IV. ________________ Clue ________________

V. ________________ Clue ________________

VI. ________________ Clue ________________

VII. ________________ Clue ________________

Peach leaf Willow

Leaves: Length more than five times width, many fine teeth
Bark: Deeply divided, with flat ridges, upper bark not smooth or creamy colored
Buds & Branches: End twigs very thin, branches alternate

Tamarack

Leaves: Many needles in a bunch, needles absent in winter, short
Bark: Very flaky, red brown
Buds & Branches: One main straight trunk, no large lower branches, small cones on branches

White Birch (Paper Birch)

Leaves: Edge irregular, with many teeth, doubly toothed
Bark: Very white, smooth and papery except in younger trees, has lenticels or bark lines
Buds & Branches: Twigs reddish, branches alternate

Sugar Maple

Leaves: Lobed, with rounded margins between lobes, several main veins
Bark: Rough and irregular, flaking in strips, gray
Buds & Branches: Opposite branches

Red Maple

Leaves: Lobed, with angled margins between the lobes, several main veins
Bark: Gray, mostly quite smooth (except some larger trees)
Buds & Branches: Opposite branches, small branches reddish, broken branches without rank odor (silver maple similar except has rank odor)

Green Ash

Leaves: Compound with many leaflets
Bark: Gray, almost fishnet like
Buds & Branches: Opposite branches, fewer small branches than other trees

American Elm

Leaves: Simple leaf has one main vein, no lobes, many teeth, upper leaf surface rough
Bark: Broad ridges, bark a sandwich of brown and white layers
Buds & Branches: Branches alternate
Trunk: Vase-shaped tree form has several main branches spreading from trunk

Balsam Poplar

Leaves: Broadly spear shaped, sharp pointed, tend to have a bronze color
Bark: Upper bark smooth, lower bark deeply furrowed
Buds & Branches: Buds large, fragrant, resin coated, branches alternate

B. Ecological Site Description

Describe the ecological nature of the site where Trees #I - VII grow. (Size of trees in forest, type of undercover, soil and water conditions, growth conditions, type of animal life which may inhabit this location, etc.) Describe especially the nature of the area in the maple stand.

NAME THE TREES - Matching Exercise

Deep Forest Trail

A. From the tree descriptions given below select the ones most appropriate and write them in the proper blanks along with the plant clue which most helped identify each tree.

VIII. ______________________ Clue ______________________

IX. ______________________ Clue ______________________

X. ______________________ Clue ______________________

XI. ______________________ Clue ______________________

XII. ______________________ Clue ______________________

XIII. ______________________ Clue ______________________

XIV. ______________________ Clue ______________________

Butternut

Leaves: Compound, with many leaflets
Bark: Light gray, with smoothish upper bark changing into shallow ridges lower down; tight bark, not flaking
Buds & Branches: Alternate, very few small branches compared to other trees, pith has partitions, end twigs large

Yellow Birch

Leaves: Almost egg shaped, larger teeth have smaller teeth
Bark: Yellow to grayish, some fine curls may peel from trunk, has lenticels like white birch
Buds & Branches: Young branches darker than main trunk, alternate

Swamp White Oak

Leaves: Simple, shallowly rounded lobes, oak type leaves, broader near end than near base, fine hairs on underside
Bark: Ridged, gray-brown, upper bark like lower bark, not tight
Buds & Branches: Branches mostly smooth, alternate branches

Basswood

Leaves: Simple, heart shaped, thin, with small teeth
Bark: Gray, thick, deeply furrowed, has horizontal cracks
Buds & Branches: Buds almost round with blunt point, usually quite red, branches alternate

Trembling Aspen

Leaves: Simple, almost round, leaf stem flat, many small teeth
Bark: Upper bark quite smooth and cream colored to yellowish, lower bark usually smoothish but tight (may be mistaken for birch)
Buds & Branches: Buds and twigs shiny, alternate

Box Elder

Leaves: Compound leaf of 3-5 leaflets
Bark: Light brown, closely but not deeply ridged, mostly tight
Buds & Branches: End twigs mostly green, opposite

Black Cherry

Leaves: Simple, very fine toothed, one main vein, thin
Bark: Black, broken into thick irregular plates
Buds & Branches: Branches red, red-brown, narrow, alternate, bitter taste

Red Oak

Leaves: Oak type leaves, lobes with very pointed tips
Bark: Upper bark mostly smooth, iron gray to black, lower bark in larger trees furrowed, tough and tight, no lenticels
Buds & Branches: Alternate, buds rounded

B. Ecological Site Description

Observe the Tag Alder Swamp at the north part of this station, describe the way the alder clumps grow. Describe the kind of plants associated with the alders. This swamp is habitat for deer, grouse and woodcock.

NAME THE TREES - Matching Exercise

Cedars Trail

A. From the tree descriptions given below select the ones most appropriate and write them in the proper blanks along with the plant clue which most helped identify each tree.

N-1 ____________________ Clue ____________________

N-2 ____________________ Clue ____________________

N-3 ____________________ Clue ____________________

N-4 ____________________ Clue ____________________

N-5 ____________________ Clue ____________________

N-6 ____________________ Clue ____________________

N-7 ____________________ Clue ____________________

N-8 ____________________ Clue ____________________

N-9 ____________________ Clue ____________________

N-10 ____________________ Clue ____________________

White Cedar

Leaves: Evergreen, "needles" like small, overlapping scales on a fan-like spray
Bark: Fibrous, thin, long strands, light brown
Buds & Branches: Tiny cones on branches, cones have very few scales (cones not always present)

Hemlock

Leaves: Evergreen, short flat needles attached to branches by tiny stalks, no needle groups
Bark: Quite dark-black, sort of scaly
Buds & Branches: Tiny cones on branches, branches very flexible (cones not always present)

White Pine

Leaves: Five soft needles in a needle group, about 3" long, evergreen
Bark: Black-brown, smooth upper bark partly green, lower bark with deep grooves in older trees
Buds & Branches: Cones only in upper branches, cones 15-20 centimeters long (cones not always present), branches have a soft flexible appearance

White Spruce

Leaves: Short angled needles, roll in the hand, no needle groups
Bark: Brown, tight, not very scaly
Buds & Branches: Like a Christmas tree, cones 2-3 centimeters

Tamarack

Leaves: Many needles in a needle group, short needles, deciduous
Bark: Very flaky, red brown
Buds & Branches: One main straight trunk, many small branches, small cones on branches

Sugar Maple

Leaves: Simple, lobed, with rounded margins between lobes, several main veins
Bark: Mostly gray, rough and irregular, flaking in strips
Buds & Branches: Opposite

Red Maple

Leaves: Simple, lobed, with angled margins between the lobes, several main veins
Bark: Gray, mostly quite smooth (except sometimes along main trunk)
Buds & Branches: Opposite, end branches may be reddish

Black Ash

Leaves: Compound leaves from one leaf stem
Bark: Gray, soft and crumbly, no regular pattern
Buds & Branches: Opposite, very few small branches
Site: Compared to other trees, found in wettest parts of swamp forest

Bur Oak

Leaves: Simple, lobed, lobe ends rounded, one pair of lobes deeper than others
Bark: Firm, tight, thick bark, vertical ridges
Buds & Branches: Alternate, buds round-pointed, corky ridges or "wings" on twigs, acorns have hairy fringed cups

Big Tooth Aspen

Leaves: Simple, rounded with large teeth, leaf stem flat
Bark: Upper bark smooth, yellowish, lower bark tight and irregularly ridged
Buds & Branches: Alternate, twigs large, and not shiny

Apple

Leaves: Simple, soft, hairy on lower surface
Bark: Mostly gray-green to black
Buds & Branches: Branches have small "spur branches", apples may be in branches, branches spread wide
Trunk: Short and squat

Basswood

Leaves: Simple, leaves heart shaped, thin, with small teeth
Bark: Gray, thick, deeply furrowed, has horizontal cracks
Buds & Branches: Buds almost round with blunt point, usually quite red, alternate branches

B. Ecological Site Description

The forest unit along the Cedars Trail is a hodgepodge mix of upland and lowland forests. Describe the ecological conditions under the cedars part of the trail area.

Reprint:
Project I-C-E RMC
1927 Main Street
Green Bay, WI 54301

Environmental Activities Training Project
Fallen Timbers Consortium Schools
1927 Main Street, Green Bay, WI 54301

Environmental Field Activity: Track Soup

Recommended Grades: Season: 7-8 Fall/Winter

Author(s): Larry DeBrunen

St. John's, Little Chute

Concept(s):
2. Ecosystem
3. Carrying capacity
6. Natural resources
7. Land use
9. Change
12. Stewardship

Integrated with:
- Mathematics
- Science
- Social Studies
- Agriculture
- Language Arts

Objective(s):

Through the observations and data collection as outlined, students will identify certain animals and make conclusions about their activities by a correct match with information provided on a number of species.

Rationale:

Animals in a forest environment are constantly at work doing what instinct tells them to do to survive. Every day is filled with time for sleeping, searching for and obtaining food, escaping from other animals, protecting young, and other instinctive habits. These activities do not just happen when we are there looking for them, or actually watching them. They are going on constantly. Most of the time we are not fortunate enough to be around to see how the animals go about daily survival. But animals do leave hints to allow us to study what he does. One of these hints is the tracks. Tracks are left by all animals, with old ones being covered up and new ones replacing them. The best season to study tracks is in the winter because they are more visible in the snow and stay around longer. Today you will study some tracks and from the information gathered, reach some conclusions about the lifestyle and kind of animal that made the tracks.

Directions:

Today you will be using the Fallen Timbers Center as a laboratory. Your project is to find tracks of some forest animal and analyze them. At the end of this exercise, you will have learned that:

1. Many different types of animals are part of our environment.
2. The lifestyle of forest animals can be studied by observing animal tracks.
3. Measurement is a useful tool in analyzing tracks.
4. Deductive judgment can be made from the information gathered.

Students should be grouped 3-4 per team, with each team having:

1 information pack and data worksheet
1 notebook
1 pencil or pen
1 ruler or other appropriate measuring instrument

With your team, enter the forest, apart from others and try to find an unfamiliar set of tracks to begin the activity by following through with each step.

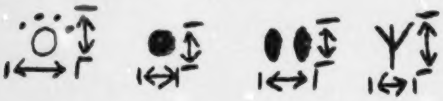
Activity Outline — Data Record:

A. With your set of tracks, mark off about a six-foot circle around the best part of the tracks. Describe the area where you found the tracks.

____
____
____
____

B. Analyzing the tracks:

1. With your ruler, measure the length and width of one paw:



1. ______________
2. ______________
3. ______________
4. ______________

Do this for several paws to get an average and record the data here.

Average ______________

If there seems to be two different sized paw prints, the animal has different front and hind paws; measure and record the second paw here:

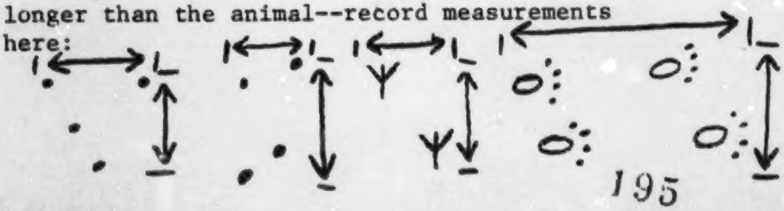
1. ______________
2. ______________

Record here the number of toes or "pods" the animal has:

1. ______________
2. ______________

2. Now measure the length and width of one entire track set of four paws, or two if a bird. (Probably because all the birds we know have only two feet!) Use the outermost edge of each track set. These measurements will tell you the approximate length and width of the animal; if running, the tracks would be slightly longer than the animal--record measurements here:

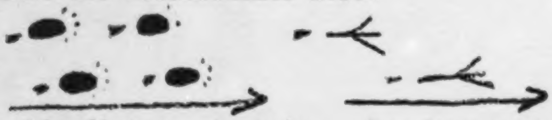
1. ______________
2. ______________



3. Next, measure the length between two consecutive four-paw (two, if a bird) tracks. Record the measurements here:

1. ______________

2. ______________



If this distance is quite a lot longer than any one track set, it is a clue that the animal was running; if distance is short, the animal was trotting or walking. Was your animal running, trotting, or walking?

____

4. Measure the depth of a track by eyeing the ruler at surface level as you insert it to bottom of track imprint. (A stick or twig can be inserted, marked at surface level and then measured.) Record depth here:

1. ______________

2. ______________

We can get an idea of animal weight from depth of track. Using something similar to paw size, impress to depth of above measurement and determine how much pressure was needed, and estimate weight of animal here:

1. ______________

2. ______________

5. Which way was your animal going? Look carefully at your track set. Which edge is sharp and defined and which is dragging or stretched? The sharp, defined edge points the way the animal was going. If an animal was running, the four paws tend to bunch in the direction he was going; for birds, the distance between feet is extended.

    1. Which way was your animal going?
    2. Where does it seem he was going?
    3. Where did it come from?

1. ______________

____

2. ______________

____

3. ______________

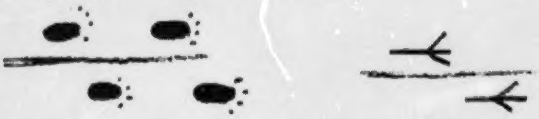
____

6. We can also tell how fresh the tracks are. Notice your own footprints in the snow. If you blow softly into your tracks, notice the fine powdery snow in the track. Note that the edge or sides of your prints are not hard, but crumble easily. These are "fresh" tracks. Old tracks may be partly covered by new snow, no powdery snow inside, edges are hard, brittle. The older the track, the more these conditions appear. Record your estimate on how old the animal tracks are here:

1. ________

2. ________

7. Now for a few odds and ends about your animal tracks. Is there a thin line between the footprints of your animal?



If there is, your animal is dragging its tail. Does your animal have a tail? ________

How many sets of tracks are there around your track set? ________

Was your animal alone, or in a group? ________

Was there a different set of tracks following or next to your set? (This could mean your animal was being chased.) ________

Does it appear that your animal stopped to eat something? What? ________

Are there any droppings between or around your track? ________

Has it snowed since your animal was here? ________

Was your animal injured? Is there any blood? ________

From the information key, was your animal male or female? ________

8. And finally, the decision--what animal made your track? ________

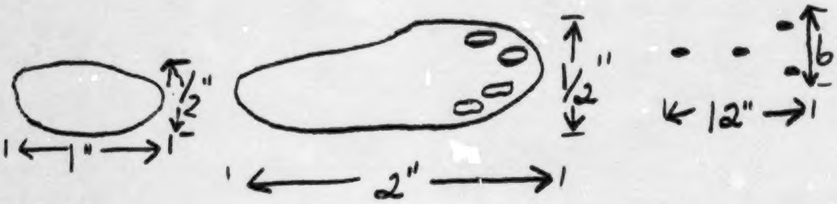
Classroom Followup:

Using the information you collected, write a story about your animal and what he was doing when the tracks were made. Make it as interesting and enjoyable as possible!

POSSIBLE TRACK MAKERS AT
FALLEN TIMBERS ENVIRONMENTAL CENTER

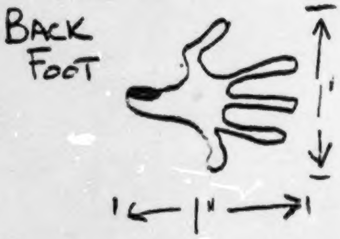
COTTONTAIL RABBIT

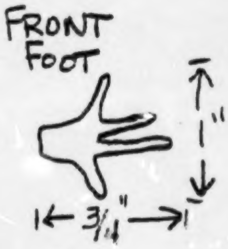
One of the most abundant animals in the Wisconsin forest is the cottontail rabbit. He is a small vegetarian that reproduces with alarming speed. He ranges from 1-3 pounds and measures about 8-12" when sitting. When he is running, he stretches out to be about twice that long from front feet to hind feet. He usually lives in thickets and dense brush or any area with a lot of cover. His chief predators are hawks, owls, and some fox.

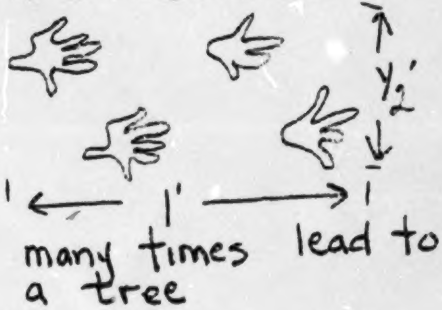


SQUIRRELS

Squirrels are another abundant member of the forest community. There are many different types of squirrels ranging from 4" to over 12" long from head to tail. The gray squirrel usually lives in a tall pine or hickory or oak tree. He swiftly jumps from limb to limb and makes a nest out of leaves. He usually eats nuts, berries and like to sun himself. Red squirrels are usually smaller and a little perkier. They eat nuts and berries, and often steal bird eggs for food. They like to live in hold hollow trees and store a lot of food for the winter months. All squirrels have as enemies are hawk, owls, and some fox. They do not hibernate in winter. Many times they will drag a tail in the tracks.



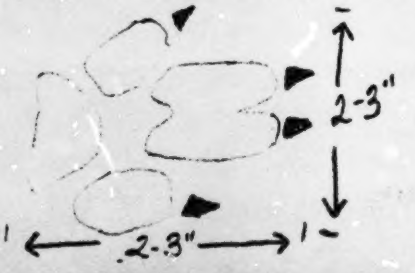


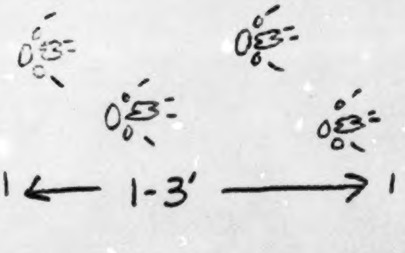


many times lead to a tree

FOX

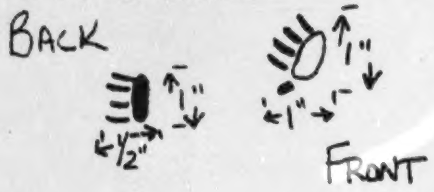
There are two types of fox found that you may run into in Wisconsin. Like the squirrel, there is the gray and the red. A fox is a very smart and crafty animal, and is very wary of man. They are very swift animals, sometimes running up to 40 miles an hour. They are meat eaters, and are the enemy of most farmers. They range from 1-2 feet high at the shoulder, and are about 2-3 feet long with a bushy 12-inch tail. They build dens in the soil, and are found all over the United States. They range in weight from 15-20 pounds.

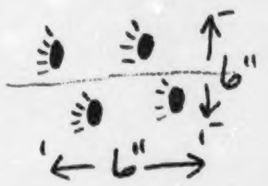


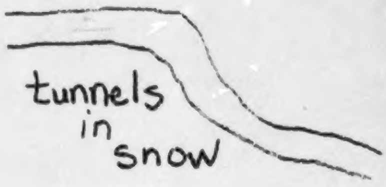


MOLE

When you find ridges on the ground, it may be the underground tunnels of a mole. Moles are about 7 inches long and have soft, close, velvety skin. It has no visible neck, very poor eyesight, and can't hear at all. They live in burrows under the ground and tunnel most of the day. It eats worms mostly and insects.

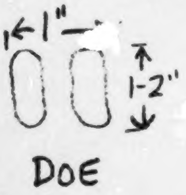


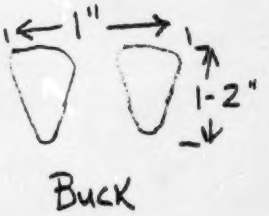


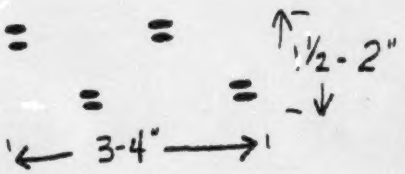


WHITE TAILED DEER

One of the most popular and most studied of Wisconsin forest animals is the deer. The white tailed deer is a magnificent animal, sometimes reaching over 200 pounds. He is about 4-5 feet high at the shoulder and is about 5-7 feet long from nose tip to tail. He is a very swift runner and jumper, and is also a vegetarian. He lives anywhere in the woods that there is cover and his coat is a light brown. The female of the species is called the doe and the male is called a buck. A young deer is a fawn. A deer's natural enemies are a wolf or bobcat and his most feared enemy is man. A buck can be distinguished from a doe by a set of antlers on the head and also by footprint in the snow.

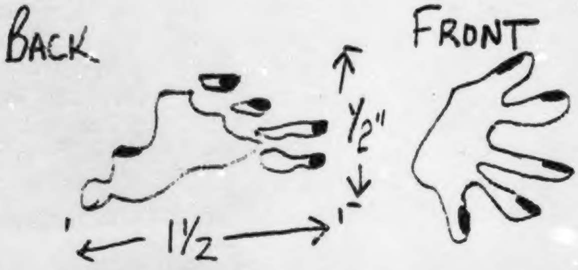


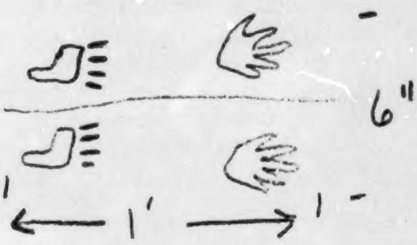




OPOSSUM

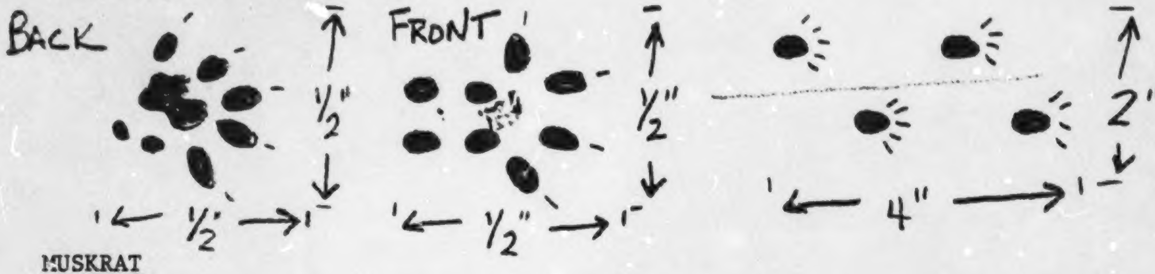
An opossum is a small animal with a gray coat and lighter face. If pursued, the opossum will lay down and play dead. He is a marsupial, which means they carry their young in a pouch. It eats insects, fruits, nuts, berries and bird eggs. They are about 1-2 feet long and can weigh up to 5 or 6 pounds.





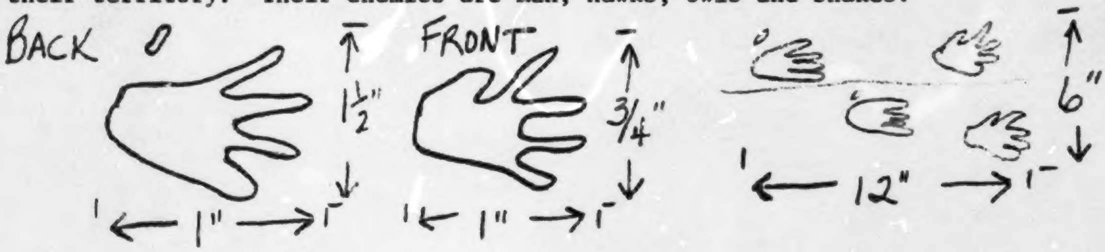
MEADOW MOUSE (FIELD MOUSE)

The meadow mouse is brown, with a compact body, short ears and is 6 inches long from the tip of his nose to the tip of his tail. He lives in heavy grass in open fields, and many times is seen burrowing under the snow in tunnel-like structures. He likes to live near water, and jumps in to escape an enemy. His enemies are hawks, owls, snakes and sometimes a bass. He weighs less than half a pound.



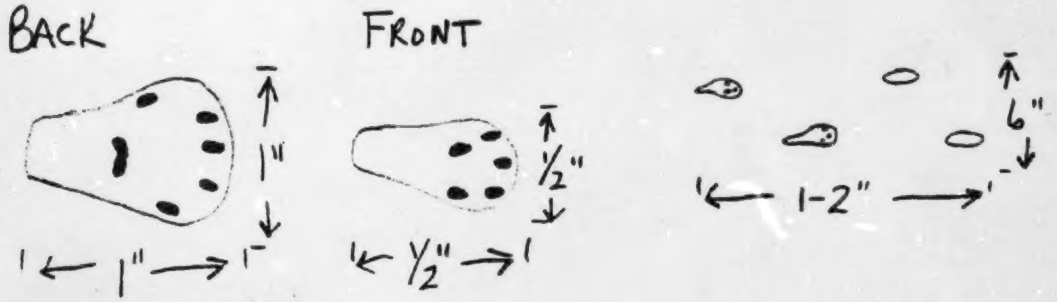
MUSKRAT

The muskrat is a 24-inch long rodent that lives in or near a pond or lake. He is an excellent swimmer and is trapped for his fur by man. They eat roots or stems of water plants, and sometimes will eat corn if they are hungry enough. They look like oversized rats, and will fight to defend their territory. Their enemies are man, hawks, owls and snakes.



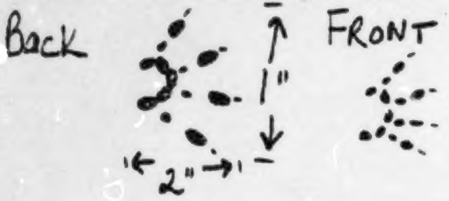
WEASEL

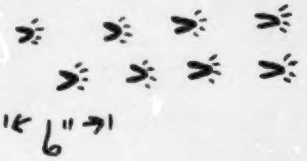
The weasel is a long, slender animal of about 2-3 feet and weighs about 7 pounds. He is a very bloodthirsty animal and will kill many rabbits, mice and chickens and not eat any of them. He is brown in summer and turns white in winter. They are about 15 inches long and extremely fast and strong.



CHIPMUNK

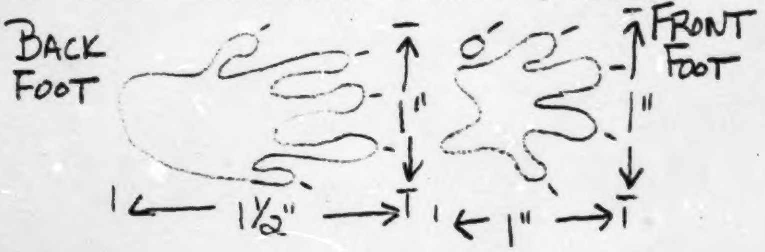
This little animal seldom holds still long enough for one to see that it is about 9 inches long and has a brown head, a gray back with black stripes and one yellow stripe on each side. He weighs less than a pound and is a vegetarian. His diet is nuts and berries and fruit. He can climb trees but prefers to stay on the ground. He lives in dense thickets under fallen trees and in small burrows in the ground. Our Wisconsin forests are full of them. His tail sometimes drags in his tracks.





RACCOON

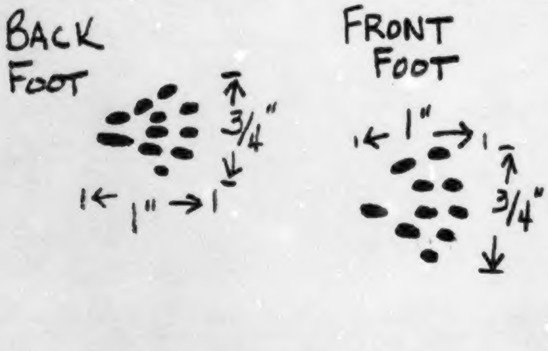
A raccoon is about a yard long, and is dark gray with fringes of while. It has a black and white striped face, a pointed nose and small ears. It has a bushy black and gray tail. He eats fish, corn, mice, insects, fruits, berries and just about anything else. He can weigh up to 25 pounds. It lives in hollow trees, and his only real threat to existence is man. He prefers to live near a lake or stream if possible.

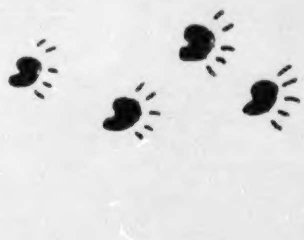


About 2-3' between back and front

SKUNK

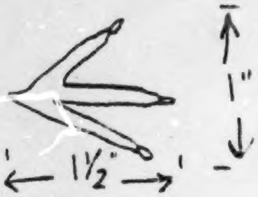
The skunk is a pretty black and white animal of about 2 feet in length and about 4-10 pounds of weight with a terrible odor he uses for protection. It lives near the edge of pastures or fields and eats mainly insects. He is very slow and has few enemies, except for an owl or two.

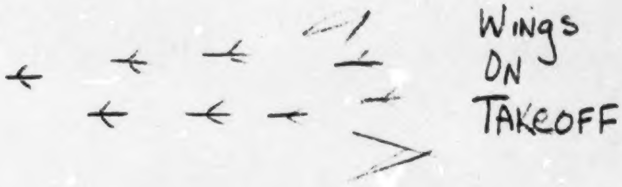




PHEASANT

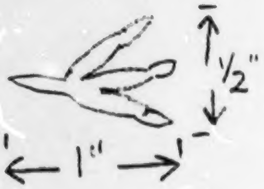
A pheasant is a very beautiful bird, with the male being much more colored than the female. He likes to live in thick brush near open fields or corn fields. They grow up to be about 18" high at the head and about 3 feet long to the tip of its long tail. They eat insects and grain, are are very swift runners and flyers. Upon taking off, they make a loud squeaking sound which is very startling.

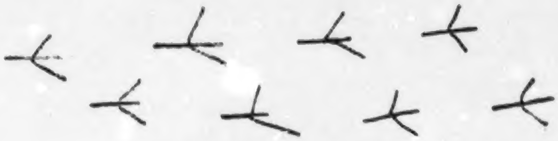




RUFFED GROUSE

The ruffed grouse is a small bird of green and brown feathers. The grouse can be about 17 inches tall and usually weigh around a pound or two. He makes a drumming sound in the woods that is used for mating and sounds very peculiar. He, too, is a swift flyer, and makes a lot of noise when he first enters the air. He can run very swiftly on the ground, also.





Environmental Activities Training Project
Fallen Timbers Consortium Schools
1927 Main Street, Green Bay, WI 54301

Reprint:
Project I-C-E RMC
1927 Main Street
Green Bay, Wisconsin 54301

Title: Slopes and Contours

Recommended Grades: Seasons: 7-9 All seasons

Authors: Suzanne Simon

(Adapted from "Contour Mapping", National Wildlife Federation) George Howlett, Jr.

Sr. Rhoda, St. Mary's, Greenleaf

Disciplines:
Social Studies
Math
Conservation

Concepts:
6. Resources

Rationale:

Contour mapping is a fun, hands on approach to the study of geography. The contour map also demonstrates the ecological significance of land forms as they affect the distribution of plants and animals in a specific region.

Equipment:

Ranging poles, sighting devices (alidades, hand levels, or sighting protractors mounted on stakes or tripods), compasses, stakes and hammers, measuring tapes, clipboards and pencils, one student activity sheet for each team (meter or 1.5 meter elevation sticks will be needed by teams using tripods or other adjustable sighting devices), local USGS contour map.

Directions:

A. Form students into teams of four each. Assign students in each team to the following duties:

Overseer:	Team leader, directs team to carry out assigned duties. Assists sighter to keep sighting device level, also assists tapeman.
Sighter:	Sights through leveling device and directs ranger to move pole to correct elevation.
Ranger:	Holds range pole and moves it as directed by sighter, may assist with measuring tape and staking.
Recorder:	Uses compass to keep crew on course, records all information.
Tapeman:	(optional position) measures distance from sighter to new elevation at range pole after staking new elevation.

B. The exercises for setting up a zero line and the first contour interval are optional at Fallen Timbers. These are permanently set up by the hill.

SLOPES AND CONTOURS STUDENT WORKSHEET

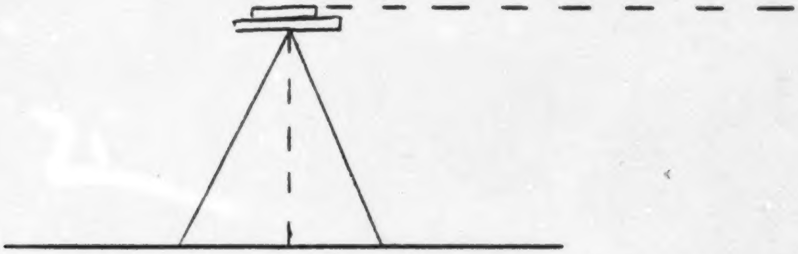
School ______________________ Date ________ Class ________________

Team Letter ______

Team members ______________________ ______________________

______________________ ______________________ ______________________

A. Set up equipment. (For teams using tripods or adjustable sighting poles). The sighting platform must be set up so that the sighting device is one meter or 1.5 meter above ground level. Use an elevation stick to check level.



Base point to eye level 1 meter or 1.5 meter

Set up tripod so sighting device will automatically be level.

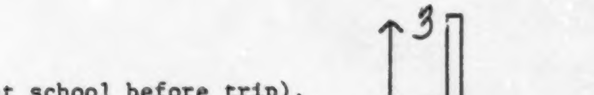
(For other types of sighting poles) use 1.0 meter or 1.5 meter support according to height of sighter. Use plumbob and line or sighting bubble to show when unit is level.

B. Directions

1. Practice session (may be done at school before trip).

   a. Level ground

FIG. 1



Practice using the equipment on a level area. This can be done at school. The ranger should hold the range pole several meters away from the sighter. The sighter plants his pole on the ground. The overseer determines when the thread drops straight along the reference line. The sighter will see a bubble in line with the level line if using the hand level. Once the device is level, the sighter should look at the range pole through the sighting device. The ranger then moves his hand slowly up and down the pole until the sighter can see the hand through the sighting device (see figure 1). The recorder records the distance from the ground to the ranger's hand.

Distance from ground to ranger's hand ________________

Distance from ground to hand level ________________

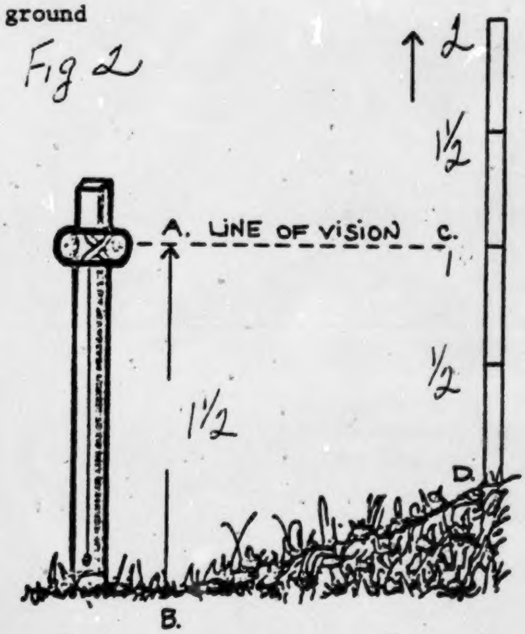
1) Is there a difference in elevation of the ground from sighter to the ranger?

2) If there is no difference, the sighting device and the range pole are on points of elevation.

Switch jobs and repeat the above instructions.

b. Non-level ground

Fig 2



The ranger should stand on a spot which is a little higher than the sighter. After the sighter and overseer have the sighting device level, the sighter should fix his eye on the ranging pole. The ranger should move his hand along the pole until the sighter sees it through the hand level (see figure 2). The ranger should measure the distance from his hand to the ground. Record the measurements. The team should answer the following questions:

1) Distance from ground to ranger's hand ______________

Distance from ground to hand level ______________

a) How do these distances compare with the distance measured when both the hand level and range pole were on the same elevation?

b) What does the difference mean in terms of the elevation of the person holding the range pole?

c) What does the difference mean in terms of the elevation of the sighter?

d) How much higher is the ground at the ranging pole than the ground at the sighter?

2)a)Under what conditions would the distance from the ranger's hand to the ground be larger than the distance from the hand level to the ground?

b) Find a spot where this would be true. Practice using the equipment in this situation.

Distance from ground to ranger's hand _____________

Distance from ground to hand level _____________

Practice using the hand level and range pole at several places which have different elevations.

II. Field Contours

Introduction

A contour map is a specific type of map which shows the shape and elevation of an area by connecting points of equal elevation with a line. Your teacher will show you an example of a contour map in class.

A. Zero line set up (optional for more advanced class)

The zero line is a straight line used for reference. To set up the zero line do the following:

Place a stake in the ground at the base of the hill. Using a compass sight along the base of the hill in either a north-south or east-west direction.

Using the sighting device, sight along the base of the hill in the set compass direction. One member of your group should walk along this line about 75-125 meters (about 40-80 paces) and drive a second stake in the ground. This north-south line is your zero line.

B. Mapping the First Contour Line (optional)

Now you are ready to lay out the first contour line. This contour line will be established a short distance from the zero line. All points along this first contour line will be at the same elevation.

1. Station each team at 5 meter distances along the zero line beginning at the starting point. Each team shall set up a line of sight at right angles to the zero line using the compass. Place a stake along the compass line to keep the team on course.
2. Station A will be base or zero elevation. Team A shall assist other teams to find zero elevation along their line of sight.
    a. The sighter from Team A and the rangers from Teams B, C, D, and E cooperate. Rangers must be kept on their team line of sight by the assistance of each team. Each ranger moves along his line of sight until the sighter of Team A calls out that the range pole is standing at a point equal to the sighter's elevation. If there are many teams, Team D sighter will do the same for Teams E, F, G, and H after zero elevation is established for Team D (A should line up Team D first).
3. Measure the horizontal distance from the zero line to the base elevation point. Record this distance from zero line to the base elevation point

    ____

    Direction from zero line to base point ____________

C. Mapping up the Hill

Each team will work up the hill along its own line of sight. To keep on the line of sight, sight toward the stake driven in the ground up the hill. When you reach that stake, extend the line by taking a new sighting along the line of sight.

n.b. A 1/2 meter contour interval should be used for this exercise.

The sighter should place the hand level at his team's base elevation stake. The ranger then moves slowly along the line of sight. When the sighter can see the range pole elevation change by 1/2 meter through the sighting device he tells the ranger to stop. The overseer checks to make sure the sighting device is level by checking the plumb bob. A stake should be driven into the spot where the ranger stops. Measure the horizontal distance with the tape measure. Do not measure along the surface of the ground (see figure 6). Record the distance.

Repeat the above steps of sighting, staking, measuring and recording until you reach the top of the hill. Keep track of your total elevation and horizontal distance in your data table.

D. Mapping down the Hill

When you reach the top of the hill proceed down the hill. The mark must be higher on the range pole because the ranger will be going down the hill (see figure 7). Use the same contour interval going down the hill as used going up.

Set a stake at the bottom of the hill along the line of sight. Now, begin surveying down hill, record your data the same as you did when going up the hill.

DATA SHEET

TEAM

DISTANCE OF 1ST CONTOUR POINT FROM ZERO LINE ________

CONTOUR INTERVAL	STAKE NO.	ACCUMULATED ELEVATION	HORIZONTAL DISTANCE

SAMPLE DATA SHEET

Team A

1/2 m	0A	0	
1/2 m	1A	1/2	
1/2 m	2A	1	
1/2 m	3A	1½	

III. Organizing the Data

When the data from all the teams are combined you will have a class contour map.

Back at school, you will draw the contour map. Your teacher will have graph paper for you to use. You may have to tape several pieces of graph paper together. Each square on the graph paper will represent a horizontal distance. For example, one square might be .2 meters or five squares would equal 1 meter. The squares must represent horizontal distance and not the distance along the ground or elevation.

Mark the zero line along the bottom of the graph paper. Letter the zero line the same as the groups were lettered. Each team should plot the location of their points. Next to each point write the cumulative elevation and team letter i.e. 0A, ½A, 1A, 1½A, 2A, 2½A, etc.

When all the points have been plotted, connect all zero elevation points, all ½ meter elevation points, all meter points, etc. (see figure 8). You must estimate what the contour line will look like between points. Look again at figure 8. Notice the way the contour lines are drawn.

Try to answer the following questions:

A. What was the difference in elevation between the first stake and the zero line?

B. What was the horizontal difference in elevation between the second stake and the first stake?

C. Was the horizontal distance between stakes always the same?

D. If not, why were there differences?

E. Of what importance is the zero line?

F. Did everyone get the same data? Why not?

G. Could sighting devices be either taller or shorter than those used? How would a shorter device change the data? A taller one?

H. Might similar results be obtained if each group surveyed around the hill instead of up it?

I. How are the steeper parts of the hill revealed on the map?

J. How are the more gradually sloping parts revealed?

K. How do cuts or gullies appear?

L. How would changing the contour interval change the contour lines?

Fig. 1 **Hill Showing Zero Line**

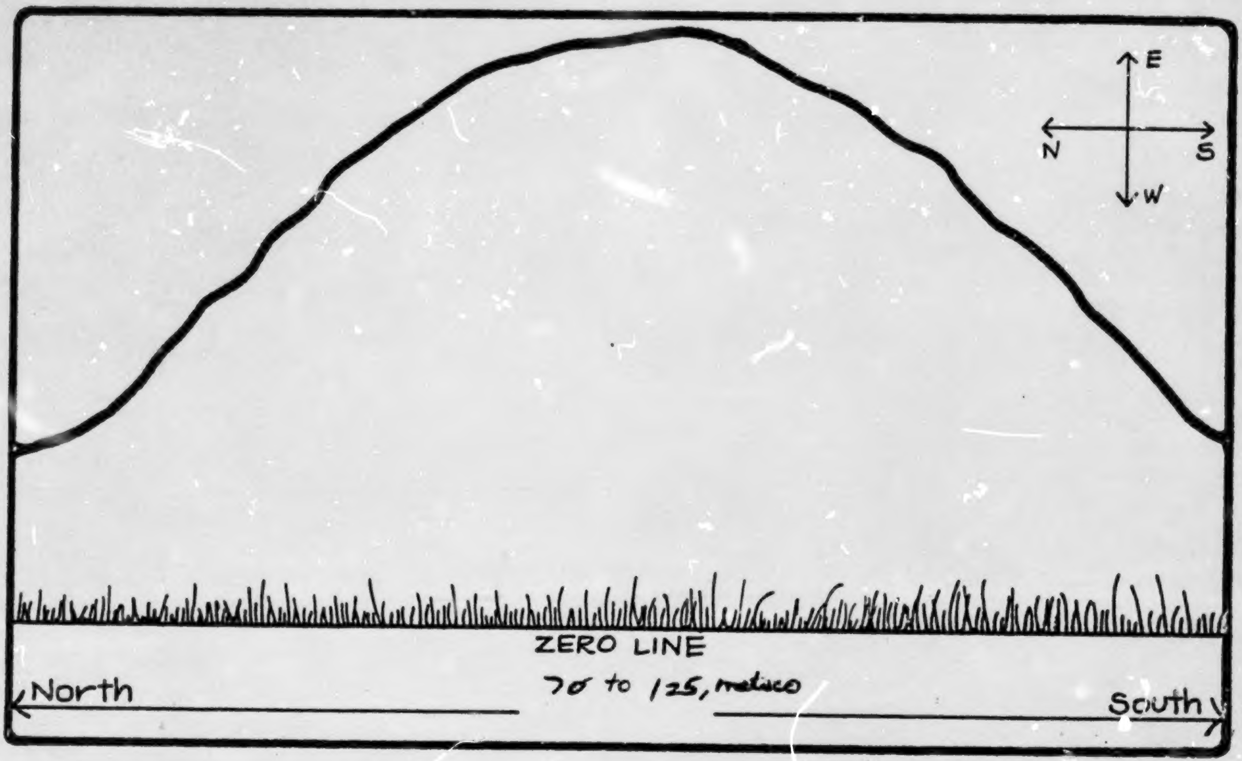

E
N
S
W
ZERO LINE
70 to 125, meters
North
South

Fig. 2 **Hill Showing Zero Line and East-West Lines**

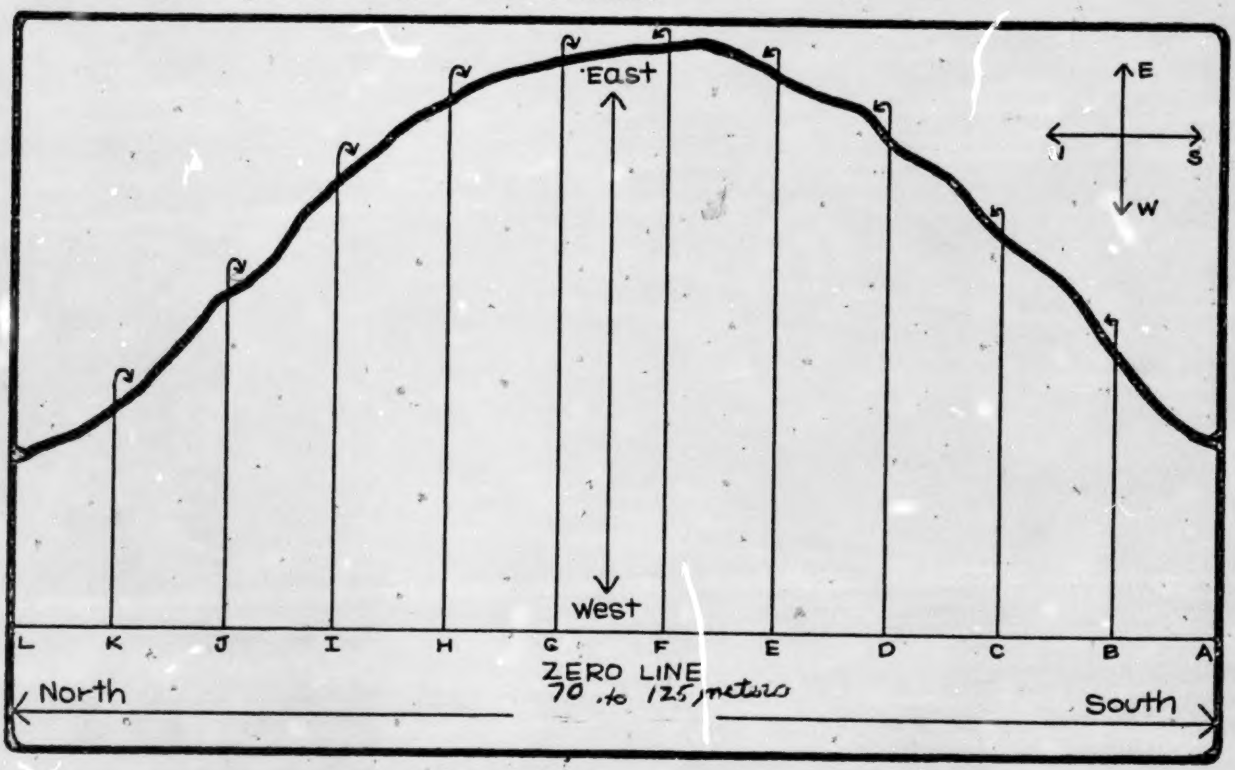

East
West
E
N
S
W
L
K
J
I
H
G
F
E
D
C
B
A
ZERO LINE
70 to 125, meters
North
South

Fig. 3 Teams A and B Establishing First Contour Line Points

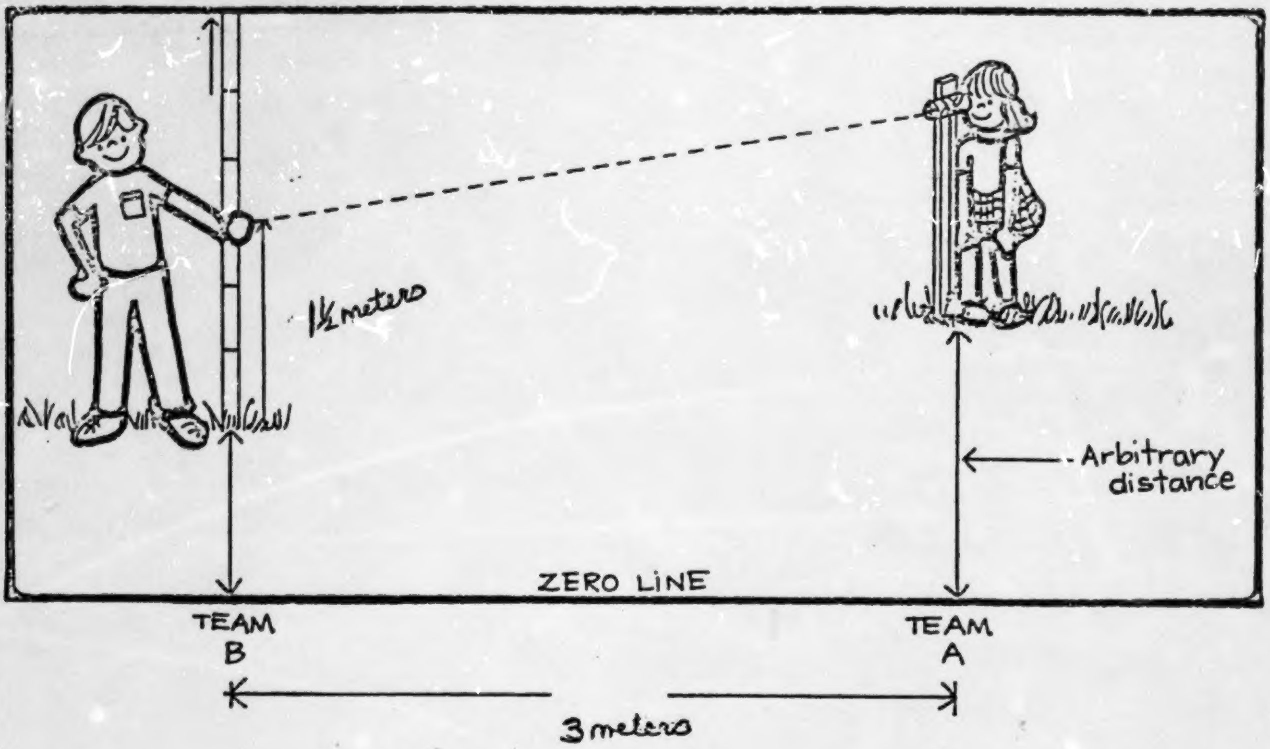

1½ meters
Arbitrary distance
ZERO LINE
TEAM B
TEAM A
3 meters

Fig. 4 First Contour Line Points Connected

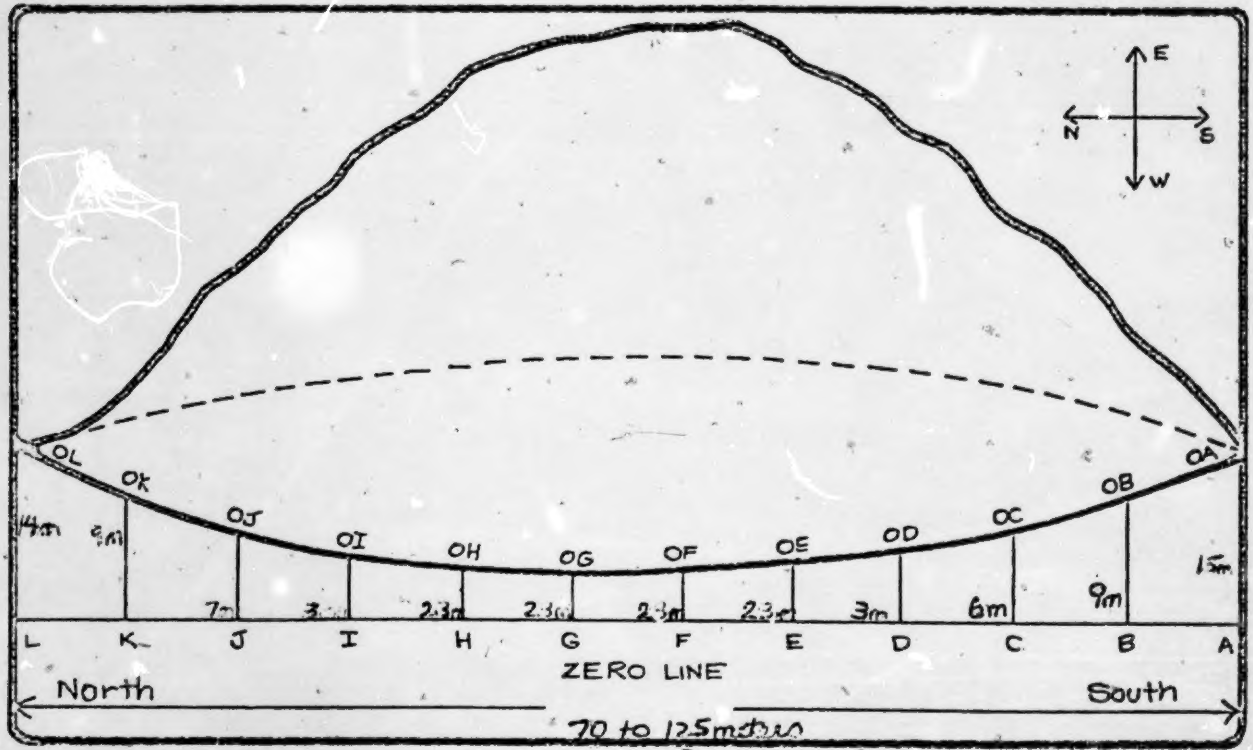

E
N
S
W
OL
OK
OJ
OI
OH
OG
OF
OE
OD
OC
OB
OA
14m
9m
7m
3
2.3m
2.3m
2.3m
2.3m
3m
6m
9m
15m
L
K
J
I
H
G
F
E
D
C
B
A
ZERO LINE
North
South
70 to 125 meters

Fig. 5 ~~Two-foot~~ 1 METER Contour Interval

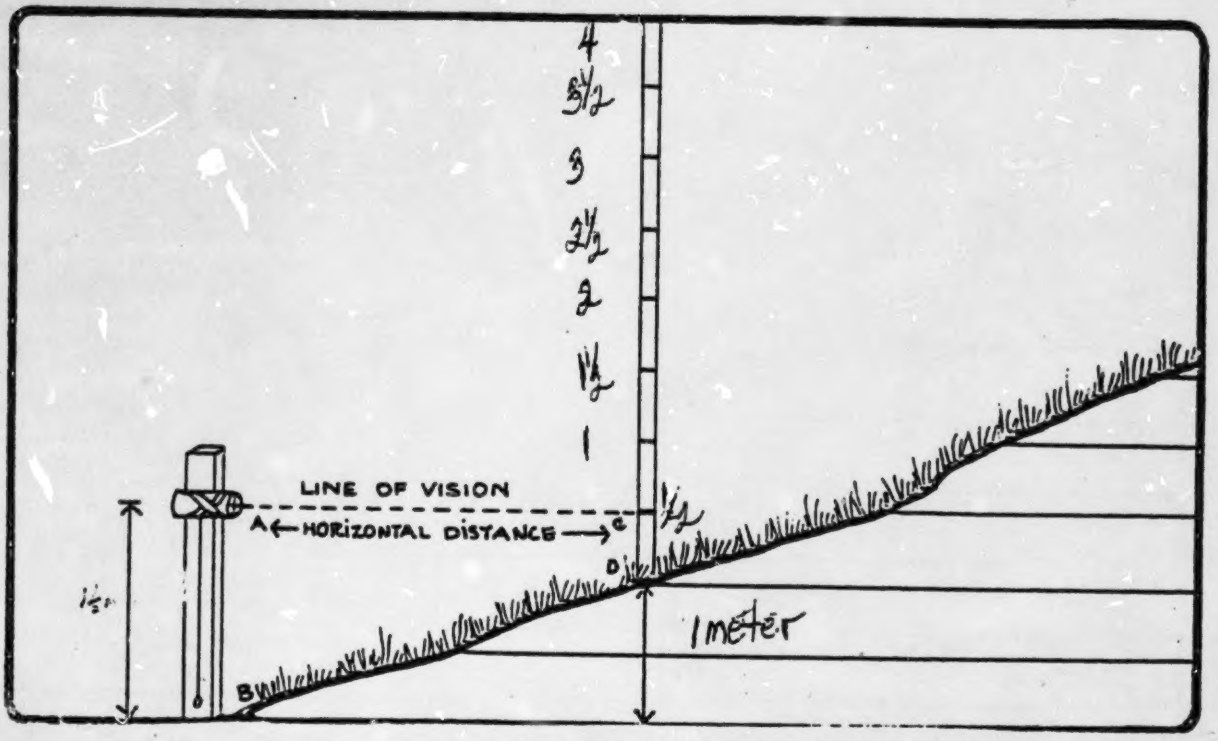

4
3½
3
2½
2
1½
1
½
LINE OF VISION
A
HORIZONTAL DISTANCE
C
D
B
1½m
1meter

Fig. 6 Contour Points Up the Hill

(Note: In Figures 13 and 14, range pole and sighting device are shown slightly offset for clarity. In practice, as you go up or down the hill, the sighting device will rest on the same spot previously occupied by range pole.)

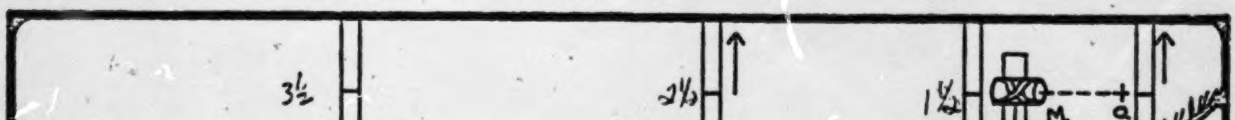
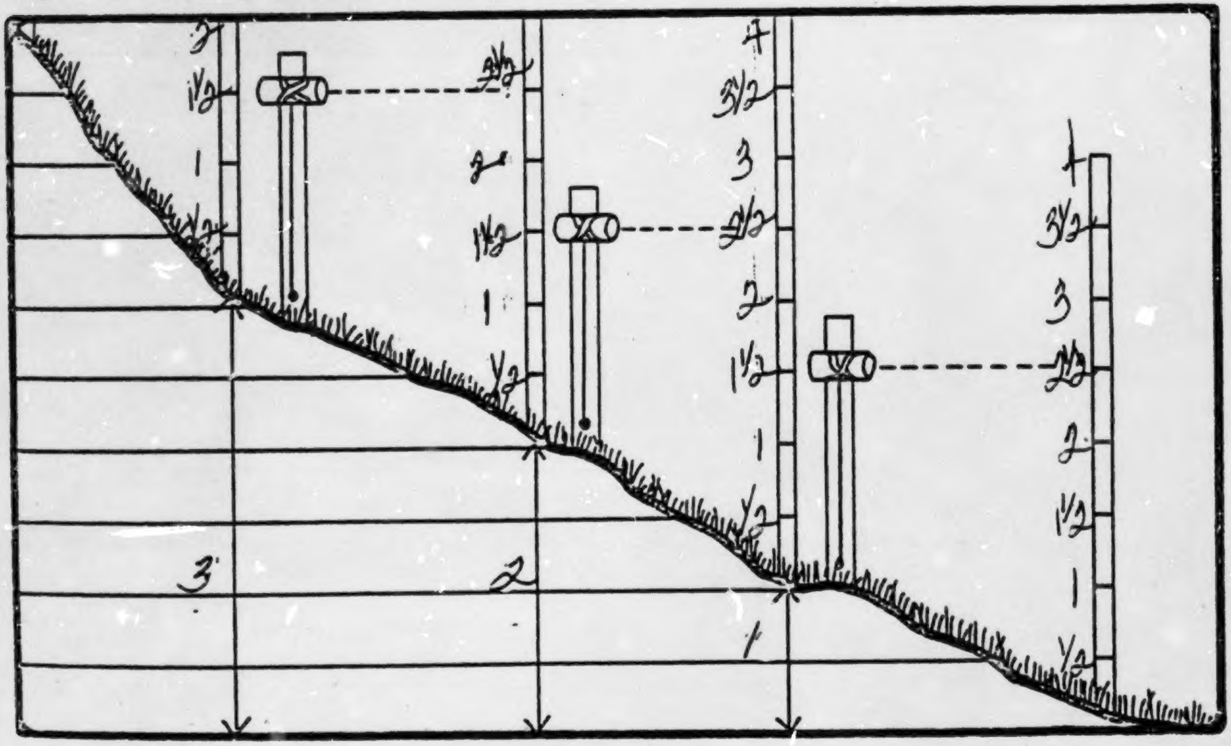

3½
3
2½
2
1½
1
½
HORIZONTAL DISTANCE
A.
C.
D.
B.
E.
F.
G.
2½
2
1½
1
½
H.
I
J
K.
L
1½
1
M
Q
R
N.
1m
2m
3m
4m

Fig. 7 Contour Points Down the Hill


2
1½
1
½
2½
2
1½
1
½
4
3½
3
2½
2
1½
1
½
4
3½
3
2½
2
1½
1
½
3
2
1

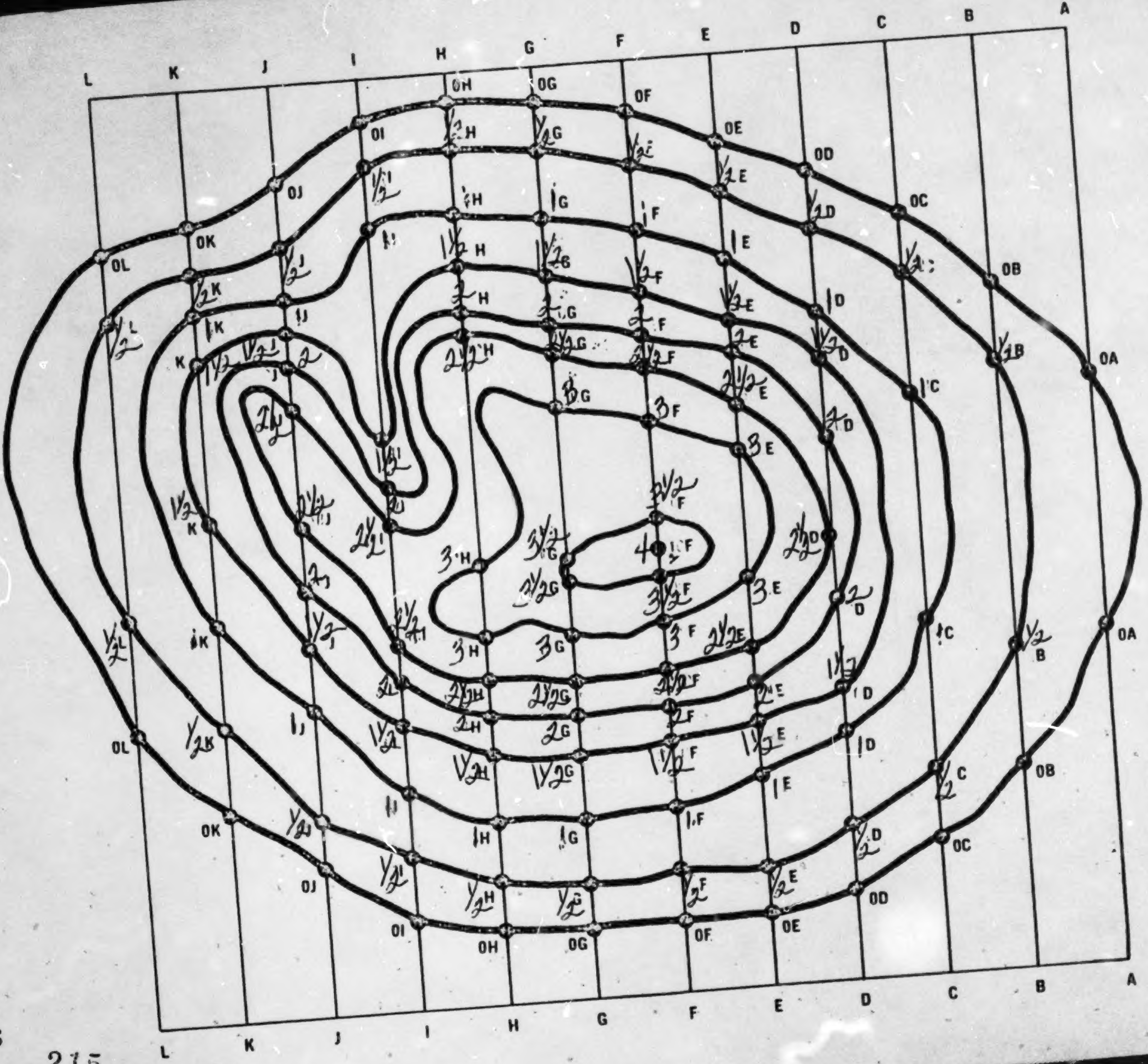
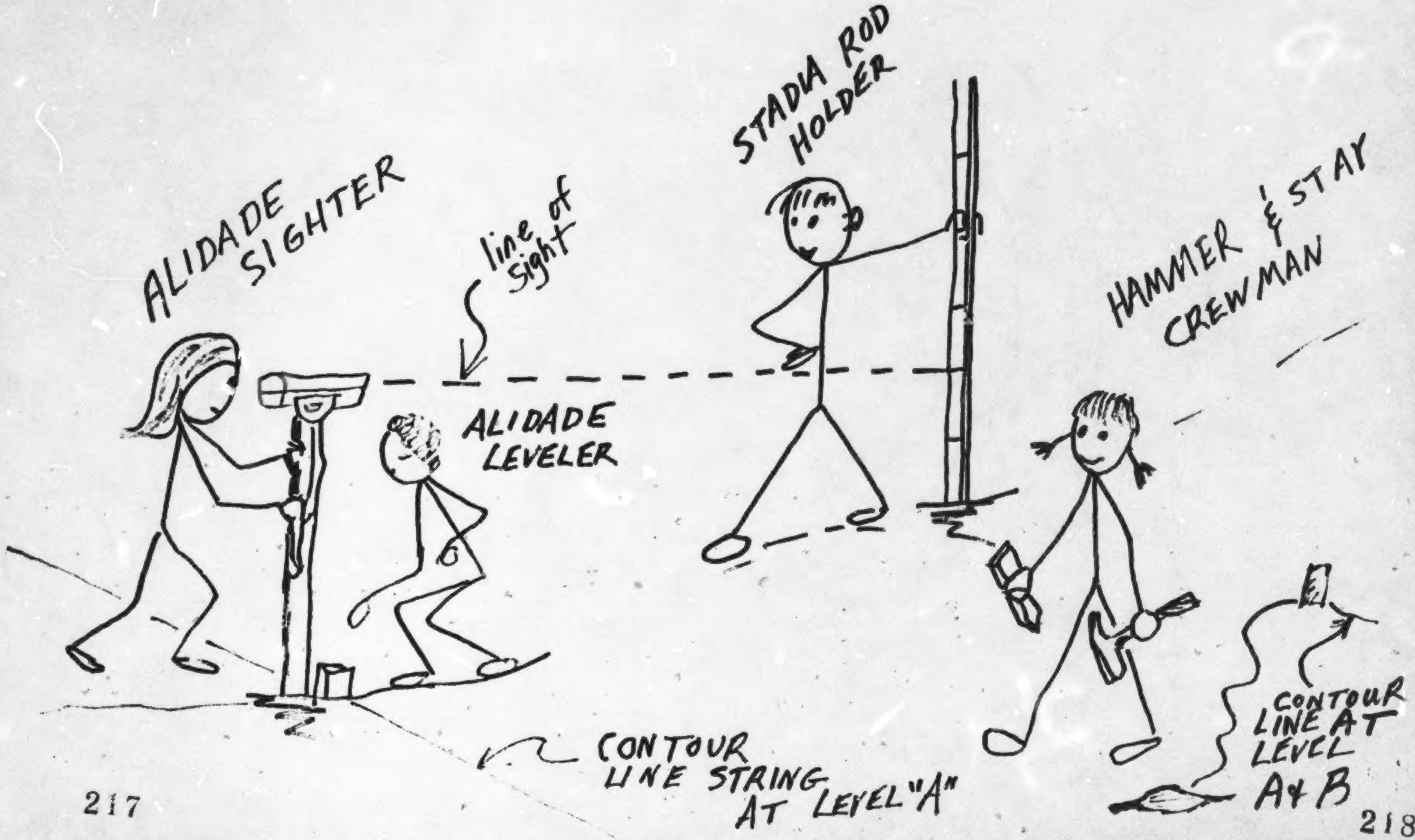

L
K
J
I
H
G
F
E
D
C
B
A
0H
0G
0F
0E
0D
0C
0B
0A
0I
0J
0K
0L
½H
½G
½E
½D
1H
1G
1F
1E
1D
1C
1½H
1½G
½F
½E
½K
½L
1K
1J
2H
2G
2F
2E
2½H
2½G
2½F
2½E
2D
3G
3F
3E
3H
2½D
4F
3½G
3½F
2½J
2J
1½J
1½K
1½L
½B
½C
1B
1½D
2½H
2½G
2½F
2H
2G
2F
1½E
1½F
1½G
1½H
1½J
1I
1E
1D
½J
½I
½H
½G
½F
½E
½D
½C
0A
0B
0C
0D
0E
0F
0G
0H
0I
0J
0K
0L
L
K
J
I
H
G
F
E
D
C
B
A

Fig. 8 Sample Contour Map

WHAT IS A SLOPE?
WHAT IS A CONTOUR LINE?


ALIDADE SIGHTER
line of sight
ALIDADE LEVELER
STADIA ROD HOLDER
HAMMER & STAY CREWMAN
CONTOUR LINE STRING AT LEVEL "A"
CONTOUR LINE AT LEVEL A & B

Environmental Activities Training Project
Fallen Timbers Consortium Schools
1927 Main Street, Green Bay, WI 54301

Reprint:
Project I-C-E RMC
1927 Main Street
Green Bay, Wisconsin 54301

Title: Tenth Acre Timber Tally

Recommended Grades: Seasons: 7-9 All seasons, good winter activity

Author: George Howlett, Jr.

Concept(s):
2. Ecosystem
6. Natural Resources
9. Management
12. Stewardship

Disciplines:
Mathematics
Science
Social Studies

Objective(s):

The student will apply the basic mathematics of circles in a field situation encountered by the practicing forester and ecologist. The student will use observation techniques for collecting ecological information at a forest site and will explore concepts of practical forest management related to a specific forest site.

Rationale/Directions:

The field class should be divided beforehand into teams of four students. Each team shall receive one diameter tape and two clipboards, one set of field sheets, two pencils. Two team members will measure the numbered trees in the tenth acre forest plot. The two remaining team members will describe the characteristics of the forest site.

Equipment:

Diameter tapes, tally boards, tally sheets, pencils, increment borer, hypsometer, soil probes, tape measure

Background Information:

The forester uses sample plots and other sampling methods to estimate the volume and rate of growth in a forest area. The forester cannot measure each tree so he estimates some of the trees and projects the sample results into a stand estimate.

The forester constantly uses mathematics. He must know mensuration (measurement) and statistics. He uses tree diameter at breast height 4½ feet above the ground (dbh) and basal areas as a simple method of estimating the amount of timber on the stand. He will decide when to cut and how much to cut in the stand based on the basal area figures.

The forester must also know site quality factors. He must judge what is the production capacity of the site. He tries to find out how fast the trees will grow and how much timber he can expect will grow on each kind of forest site. The forester is a practical ecologist who makes forest management decisions according to the ecological capacities of the forest site.

Class ______________ Instructor ______________ School ______________

Time ______________ Date ______________ Weather ______________________

Forestry Survey Team Team Number ______

Forester ______________ Forest Ecologist ______________

Tallyman ______________ Forest Technician ______________

Forestry Aide (extra person) ______________________

Activities

A. Tenth Acre Tally (forester and tallyman)

1. Record the diameter of each numbered or marked tree inside the tenth acre plot (trees four inches or more dbh, live trees only).

dbh measurement Record to nearest 1/2 unit (inch or cm)

No.	Diameter	Basal Area	No.	Diameter	Basal Area	No.	Diameter	Basal Area
1			11			21		
2			12			22		
3			13			23		
4			14			24		
5			15			25		
6			16			26		
7			17			27		
8			18			28		
9			19			29		
10			20			30		

Sub. T. B.A. ______ Sub. T. B.A. ______ Sub. T. B.A. ______

Total B.A. ______

2. Convert the diameter recorded in your tally to basal area by consulting the table below. This table is universal for diameters and areas of circles. Conversion units will work for both inches and centimeters.

Conversion of Diameter Measurements to Circular Area Values

Diameter	Area	Diameter	Area	Diameter	Area
4.0	12.57	23.0	415.48	42.0	1385.44
4.5	15.90	23.5	433.74	42.5	1418.62
5.0	19.63	24.0	452.39	43.0	1452.20
5.5	23.75	24.5	471.43	43.5	1486.17
6.0	28.77	25.0	490.87	44.0	1520.53
6.5	33.18	25.5	510.70	45.5	1625.97
7.0	38.48	26.0	530.93	46.0	1661.90
7.5	44.18	26.5	551.54	46.5	1698.22
8.0	50.27	27.0	572.55	47.0	1734.94
8.5	56.75	27.5	593.96	47.5	1772.05
9.0	63.62	28.0	615.75	48.0	1809.56
9.5	70.88	28.5	637.94	48.5	1847.45
10.0	78.54	29.0	660.52	49.0	1885.74
10.5	86.59	29.5	683.49	49.5	1924.42
11.0	95.03	30.0	706.86	50.0	1963.49
11.5	103.87	30.5	730.62	50.5	2002.96
12.0	113.10	31.0	754.77	51.0	2042.82
12.5	122.72	31.5	779.31	51.5	2083.07
13.0	132.73	32.0	804.25	52.0	2123.71
13.5	143.14	32.5	829.58	52.5	2164.75
14.0	153.94	33.0	855.30	53.0	2206.18
14.5	165.13	33.5	881.41	53.5	2248.00
15.0	176.71	34.0	907.92	54.0	2290.22
15.5	188.69	34.5	934.82	54.5	2332.83
16.0	201.06	35.0	962.11	55.0	2375.83
16.5	213.82	35.5	989.80	55.5	2414.22
17.0	226.98	36.0	1017.88	56.0	2463.01
17.5	240.53	36.5	1046.34	56.5	2507.18
18.0	254.47	37.0	1075.21	57.0	2551.76
18.5	268.80	37.5	1104.46	57.5	2596.72
19.0	283.53	38.0	1134.11	58.0	2642.08
19.5	298.65	38.5	1164.16	58.5	2687.83
20.0	314.16	39.0	1194.59	59.0	2733.97
20.5	330.06	39.5	1225.42	59.5	2780.50
21.0	346.36	40.0	1256.64	60.0	2827.43
21.5	363.05	40.5	1288.25		
22.0	380.13	41.0	1320.25		
22.5	397.61	41.5	1352.65		

3. Add the totals of the basal areas for the stand (see your tenth acre tally.

a. Total sum B.A. ____________

b. Multiply by 10 for basal area per acre 10 x ____ = ______BA/Acre.

B. Forest Site Evaluation

The forest ecologist and the forest technician will evaluate the area in and nearby to the tenth acre plot for its potential to grow timber crops.

1. Trees
    - a. Identify trees in the stand
    - b. Note percent of crown cover if in leaf
    - c. Condition of trees (healthy or poor)
    - d. Form of trees (straight, crooked, forked, etc.)
    - e. Successional stage (pioneer, midstage, climax)
    - f. Kind of reproduction
2. Shrub cover
    - a. Height
    - b. Cover
    - c. Diversity (number of different types/species)
3. Ground cover
    - a. Herbs and grasses
    - b. Mushrooms, lichens, mosses, etc.)
4. Geology
    - a. Take three different soil probes, note texture and layering of soil
    - b. Observe soil profile in soil pit, describe soils
    - c. Observe for rocks and topography
    - d. Soil/Water aspects of site
5. Animal life
    - a. Note signs of animal and bird presence and use of area (nests, browsing, digging, tracks, sighting of animals)
6. Signs of fire and other disturbances
7. Other notes on the nature and quality of this site

C. Demonstration of Forest Survey Methods

1. Increment boring: The leader will age a representative tree with the increment borer. Age of tree from ring count __________
2. Hypsometer measurement of height of dominant tree: The leader will measure the height of a dominant tree with a hypsometer instrument from one chain distance (66 feet). Height of dominant tree __________
3. Discussion on height and age factors.

D. Discussion of Forest Management and the Use of Forest Mathematics.

1. Basal area as a guide to forest management and cutting decisions.
2. The "rule of 4" factor in areas of circles. Note: If the diameter of a circle doubles, the area increases by 4. Take any diameter, double it and compare the area figures.
3. Discussion on diameter, circumference, pi, area, basal area as useful mathematical units for use in the world of work.
4. Evaluation of the forest site and the type of timber on the site.

Environmental Activities Training Project
Fallen Timbers Consortium Schools
1927 Main Street, Green Bay, WI 54301

Reprint:
Project I-C-E RMC
1927 Main Street
Green Bay, Wisconsin 54301

Title: Community Changes

Recommended Grades: Seasons: 8-12 Fall, Spring

Author: Suzanne Simon

Adapted from BSCS Green Version High School Biology Text, Investigations 3.1. "Study of a Biotic Community".

Concepts:
2. Ecosystem
9. Change

Integrated with:
Science
Math

Objectives:

Through the directions given and the activities outlined students will record data on three communities in different stages of succession and, in comparing, will conclude and correctly identify the succession stage of each community.

Directions:

Stretch a piece of rope, the transect, from about 20 feet into the goldenrod meadow into the birch-aspen forest area and down along winter path. By doing this you will have entered several succession stages. The last area by winter path was an older succession stage, that of American elm. The elm was wiped out by disease and succession has begun again at the pioneer stage.

Divide the class into groups of four, assign one person to be the team leader. Assign others to be: recorder, surveyor and naturalist. Hand out all equipment and give directions for use. The teams are responsible for marking out a 10-foot square along the transect line, identifying plants, recording heights of plants and recording animal signs and abiotic conditions. Give the teams about 40 minutes to set up the areas and do the necessary identification and measurements. Then, as a class move along the transect having each group briefly review their findings. If more groups are to do the same activity, leave the quadrants up to save time in future groups.

Back at school, have the students press and mount the plant specimens, answer questions and compare communities. The area doesn't have a true climax community. Go over with the students the type of plants which would be found in a climax forest in Wisconsin.

Community Changes
Student Directions

The process by which a community gradually changes over a period of time until we consider it a new community is called succession. A community is an area where many species of plants and animals are regularly found together. A field is an example of a community. If a field is left alone, shrubs and later trees will grow in the field. In time we could no longer call the area a field but rather we would call it a forest. Since you can't keep coming back to an area over 50 years to learn about succession, we will instead take a look at an area which has several different stages of succession.

You will be working in teams of four along a transect line. A transect is a line made by a piece of rope through an area. It is a method of taking a sample of an area without having to measure the whole area. Your teacher will space the teams along the transect.

Each member of the team will have a specific duty. However, it is the responsibility of everyone on the team to see the job done. If you finish your job, help a teammate out.

The team leader will be responsible for making sure all parts of the activity are done. The team leader helps out the other members of the crew. The recorder keeps the written records for the team. The surveyor measures out the area to be studied, with the help of the other team members measures the height of the vegetation and makes the abiotic measurements. The naturalist uses the plant books to determine the type of vegetation in the community.

A. Measuring the Area

Use one edge of the transect line as one side of a 10 foot by 10 foot quadrant. Try to make the quadrant as square as possible. Trees and bushes may make this difficult, but try to be as accurate as possible.

B. Gathering Plant Data

Plants may be divided into three groups: trees, shrubs, herbs. A tree is a tall, woody plant over four inches in diameter. A shrub is a woody plant with many trunks. Saplings are young trees with trunks under four inches in diameter. They are to be studied with shrubs. Herbs are non-woody plants that die back in wintertime. Tree seedlings are very young trees less than 1/2 inch in diameter. Seedlings should be studied with herbs.

Identify the major plant types. Use the tree key to determine the tree and shrub species. General plant names may be used for the herbs, i.e. grass, mint, dandelion, etc.

Write the names of the plants in the appropriate order of importance. That is according to the number of each species found.

Take a small sample of each species, 2-3 leaves with stem. Mark the three bags; trees, shrubs and samplings, and herbs and seedlings. Place the sample in the appropriate bag. Back at school you will press and mount each specimen.

C. Gathering Other Community Data

Animal Life. In your quadrant, check under stones, in trees and any other place for animals or signs of animal activity. This will probably include spiders, insects, birds and mammals.

The Abiotic Environment (the nonliving world). An important influence on the plants and animals living in a community in the non-living factors. Use your pencil to gouge out some of the soil. Also measure the depth of the litter (loose organic matter) on the surface of the soil. In one plastic bag, place a small amount of soil, in the other plastic bag put a sample of the litter. When you get back to school you will study these further. Take temperature readings, anemometer readings and, if possible, a humidity reading with a sling psychrometer (directions for use will be included with the instruments).

If there is time, as a class go from station to station. Each team will make a brief report on their area including dominant plant types, animal numbers of the community and abiotic factors.

D. Back At School

1. Each team should press mount and label the plant specimens.
2. Dry and analyze the soil and litter samples. A Berlese funnel could be set up to gather information on the members of the litter community.
3. Make a chart of the animal members of the community, where possible label as first, second and third order consumers.
4. Make a chart listing the abiotic characteristics.
5. Each team's report and charts should be displayed in the classroom. Make a final comparison of the different successional changes.
6. Discuss the following questions:
    a. Are producers (plants) abundant or rare?
    Which producer is the most abundant in each area?
    b. If there are different groups of producers, which one seems to contribute the most toward producing food.
    c. How does the type of producer change from one quadrant to the next?
    d. How could the producers affect the abiotic environment?
    e. Can one type of producer influence another producer? In what ways?

f. Do the different communities produce all their own food or is food carried in from beyond the community boundaries? What evidence do you have if your answer is yes?

g. What consumers are in the different communities? How do the types of consumers change from one community to the next?

h. Which consumer orders (first second or third) are represented in the different communities?

i. Besides food relationships, did you find any evidence that one species in a community affects another species?

j. Did you find any evidence that one community could affect another community?

k. What is a pioneer community?

l. Which plants are considered to be a pioneer plant?

m. How is succession started? How do you think it started at Fallen Timbers?

Community Changes: A Study in Succession
Student Worksheet

Team Number __________ (mark all bags with this number)

Team Members

Leader ____________________ Surveyor ____________________

Recorder ____________________ Naturalist ____________________

TABLE 1 - TREES

No.	Species - Common Name	No. Counted	Approx. Height
1			
2			
3			
4			
5			
6			
	Total		

TABLE 2 - SHRUBS AND SAPLINGS

No.	Species - Common Name	No. Counted	Approx. Height
1			
2			
3			
4			
5			
6			
	Total		

TABLE 3 - HERBS AND SEEDLINGS

No.	Species - Common Name	Herb or Seedling	No. Counted or % of Area Covered
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
	Total		

TABLE 4 - ANIMAL LIFE

No.	Animals or Animal Signs, where found	No. Found	Consumer Order; 1, 2 or 3
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
	Total		

TABLE 5 - THE ABIOTIC ENVIRONMENT

Soil Type (sand, clay, silt, peat)	
Depth of litter	
Temperature at ground level	
Temperature at waist level	
Temperature in foliage above head	
Wind speed (anemometer reading	
Relative humidity, sling psychrometer reading	

Environmental Activities Training Project
Fallen Timbers Consortium Schools
1927 Main Street, Green Bay, WI 54301

Reprint:
Project I-C-E RMC
1927 Main Street
Green Bay, Wisconsin 54301

Title: Trees Have Heart Attacks Too!
(A Forest Disease Exploration)

Recommended Grades: Seasons: 9-10 All, Summer and Fall best

Author: George Howlett, Jr.

Concepts:
3. Carrying Capacity
9. Management

Integrated with:
Science
Conservation
Social Studies

Objectives:

Students will observe symptoms of tree disease and factors permitting disease infection. Students will show by the discovery method that they can recognize signs and symptoms of forest disease. Students will receive information regarding the effect of forest disease on timber production.

Equipment:

Clipboards, study sheets, pencils, hand lens

Rationale:

Few people are aware that insect and disease destroys more timber than fire. Fewer are aware of the role of disease in the ecological balance within a forest. We find that few persons can trace the more complex food chain in which a tree is the principal producer.

This exercise explores the complex ecology of the mature forest from the point of fungal agents which cause the death and recycling of tree produced biomass.

Note: Predivide into study teams.

Pretrip preparation:

1. Introduce students to the concept of plant disease. Ask students to name some agents which cause plant damage and destruction.

2. Terms suggested for a dictionary exercise:

   Pathology
   Disease
   Symptom
   Rot
   Wilt
   Canker
   Dutch elm disease
   Vector (biological meaning)
   Polypore
   Decay
   Rotation
   Salvage
   Decadent
   Infection
   Resistant
   Causal factor
   Defect
   Longevity

3. Discuss disease as a cause for loss of saw timber and as a cause of grade reduction in timber.

Field Activity 1½ hours

A. Orientation 25 minutes

Station: Main Cabin
Informational talk by Fallen Timbers staff
a. Tree diseases on trail
b. Economic impacts of forest disease
c. Role of insect vectors
Forest disease exhibit
View samples of signs of tree diseases

B. Walking tour: Selected symptoms of tree disease 50 minutes

Note: Position and sequence of tour stops will change from time to time as trees die. Use black and white stations marked with Roman numerals.

STATION I Maple Dieback

Observe conditions in sugar maple stand south of main cabin. Note loss of leaf growth at top of trees or ends of branches.

Causal Factor Search - Station I

Find some of the causes. Look around the trees and stumps for signs of why the maples are dying. Check the symptoms and signs found:

_____ Catface
_____ Root scalp
_____ Sap sucker sign
_____ Butt rot
_____ Heart rot
_____ Leaf scorch
_____ Branch stub infection
_____ Tapping injury
_____ Wilt

Discuss causal factors.

STATION II Dutch Elm Disease

Observe ghost forest of dead elm on deep forest trail.

a. Look for signs of elm bark beetles; describe.

____

b. Count the number of dead elm trees to south of Deep Forest Trail at Station II.

# of elms _________

c. Decide which trees are replacing elm in the new forest

d. What are the symptoms of Dutch elm disease in a living tree?

Station III Butt Rot

Observe butt rot on balsam poplar. In the fall look for mushrooms near the base of the tree. What might be the contributing cause?

Station IV Wood Rot Fungi

Observe the growth of fungal fruiting bodies on an old stump. Do not remove the mushroom materials.

a. What is the name of the internal mass of the mushroom?

b. To what group does this fungus belong?

Why?

c. What does the fungus do to the stump?

Station V White Heart Rot

Observe horse hoof shaped fruiting bodies of *Fomes igniarius* fungi on sides of aspen species.

a. Discuss how unhealed branch stubs serve as infection point for rot spore entry.

b. Look for branch stubs which could be infected.

c. Look for trees killed by white heart rot.

Section VI Hypoxylon Canker

Observe aspen tops for sign of Hypoxylon mammatum infection.

a. What does pathological rotation mean in forest management?

b. Why does aspen have a short pathological rotation age?

b. Why does aspen have a short pathological rotation age? ____________________

Station VII Sound Mature Tree

Observe mature tree not showing disease signs or symptoms.

a. Why would this tree have survived while others have become infected?

____

____

b. How long might this tree live before becoming infected?

____

Station VIII Target Canker

Observe example of target canker caused by nectria fungus.

a. What effect does this canker have on longevity of tree?

____

b. What effect does the canker have on the value of a saw log cut from the tree?

____

Station IX Seam Crack

Observe seam crack in tree.

a. Is this a disease? ____________________

b. Could this be an entry point for disease? ____________________

c. Is the potential saw log defective? ____________________

C. Disease Search 10 minutes

Decadent Forest Plot

Within this area, you are to search for signs and symptoms of tree disease. Stay within the area indicated by the trail guide. Work in teams of three.

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1. Check off each disease seen.

2. Keep a running count of each disease seen more than once. Add additional checks for the presence of the disease in each additional tree (multiple fruiting bodies on the same tree count once.)

_____ Butt rot

_____ White heart rot

_____ Dutch elm disease

_____ Target canker

_____ Hypoxylon canker

_____ Cat face

_____ Seam crack

_____ Other

3. Discuss the relative health of the observed study stand.

Environmental Activities Training Project
Fallen Timbers Consortium Schools
1927 Main Street, Green Bay, WI 54301

Reprint:
Project I-C-E RMC
1927 Main Street
Green Bay, Wisconsin 54301

Title:	Hunter Safety Field Course
Author:	George Howlett, Jr.
Adapted from:	NRA Hunter Safety and Conservation Program and DNR Hunter Safety Program
Age:	12 years to adult (must be 12 years old or older to take DNR certified course)
Seasons of Use:	Spring, Summer, Fall

Disciplines:

Physical education
Conservation
Science
Ethics

I-C-E Concepts:

8. Values & Attitudes
12. Stewardship

Behavioral Objectives:

The student shall, under guidance of experienced gun safety personnel, demonstrate safe gun handling procedures under field conditions.

The student shall demonstrate the ability to discriminate between legal game animals and protected species or forms.

Equipment:

An unloaded gun and gun case, availability of parked auto, broomstick or unloaded BB guns, various animal mockups or decoys of game and protected species, sample of shotgun, 22, and 30.06 ammunition or cases (for identification only), marked field course with designated test situations as listed in field activity, one compass for each team, gun cleaning kit, copy of field activity for each team.

Pre-Trip Preparation:

Participation in DNR hunter safety course and written test.
Reading of NRA Hunter Safety and Conservation Manual advised as a pre-trip review.

Field Activity:

This exercise combines the field course of the NRA Hunter Safety and Conservation Program with the practical test of the DNR Hunter-Safety Certification Program.

Instructors and students in small groups of 3-6 proceed from the starting point in the parking lot and along the hunter-safety trail. They encounter various test situations involving safe gun handling and game recognition. The course may be graded on a 5-point per situation basis. The course is intended as a teaching situation. Students should be critiqued during and at the end of the exercise.

Field Course

Student teams with instructor move along the field course in the following sequence:

Station		Activity	Score/Comments
HS1.	Auto	Remove gun from gun and case	
HS2.	Auto	Demonstrate how to pick up and inspect un	
HS3.	Gate	Pass through gate using proper procedure	
HS4.	Table	Demonstrate gun safety location and action	
HS5.	Table	Identify ammunition; state maximum range	
HS6.	Table or Cabin	Request permission to hunt.	
HS7.	Pond	Ducks, species and point value; safety aspect	
HS8.	Goldenrod Trail	Rabbit, species and safety aspect	
HS9.	Goldenrod Trail	Owl, species and safety aspect	
HS 10.	Goldenrod Trail	Gun handling in file on narrow trail	
HS 11.	Goldenrod Trail	Deer, species and safety aspect	
HS 12.	Goldenrod Trail	Grouse, species and safety aspect	
HS 13.	Goldenrod Trail	Squirrel, species and safety aspect	
HS 14.	Trail to Field	Crossing of farm fence	
HS 15.	Goldenrod Meadow	Gun handling in field in a line of hunters	
HS 16.	Goldenrod Meadow	Pheasant, species and safety aspect	

Station		Activity	Score/Comments
HS 17.	Willow Scrub	Procedures in dense brush	
HS 18.	Compass Station	Compass check	
HS 19.	Pulp Deck	Safety procedure for running with gun	
HS 20.	Goldenrod Trail Bridge	Non-game bird in bush (real birds as available)/walking across log bridge	
HS 21.	Pond	Ducks on pond - safety aspect	
HS 22.	Table	"Unload" weapons, gun cleaning demonstration	

Instructional Notes:

Instructors will assist students in the following manner:

1. Demonstrate position of safety and the action mechanism of sample gun.
2. Inform students of what is expected at each test station.
3. Make comments on results at each station.
4. Review safety and law aspects of exercise at end of field course.

Notes on course situations for instructors:

1. Know safe gun handling procedures at auto--along trail, at fence, in line in field, crossing through brush, crossing on a log, running with gun.
2. Know legality of game/non-game animals encountered and background safety situations.
3. Know ranges of standard ammunitions.
4. Know how to use compass.
5. Know how to clean gun.
6. Know procedures for requesting permission to hunt.

Environmental Activities Training Project
Fallen Timbers Consortium Schools
1927 Main Street, Green Bay, WI 54301

Reprint:
Project I-C-E RMC
1927 Main Street
Green Bay, Wisconsin 54301

Title: The Forester at Work I: Ecological Forest Survey

Recommended Grades: Seasons: 10-12 All, suitable for winter field use

Author: George Howlett, Jr.

Concept(s):
2. Ecosystem
10. Economic gains
12. Stewardship

Disciplines:
- Advanced biology
- Conservation
- Agriculture
- Economics
- Mathematics

Objective(s):

Students will perform a forest ecological cruise using appropriate forestry tools, calculate site inventory information based on collected data and make an estimate of site quality and type based on general site observations.

Reference for class use:

Forestry Manual for Vocational Agricultural Instructors, Wisconsin Department of Public Instruction

Equipment:

Tape measures, diameter tapes, tally boards and sheets, compasses, increment borers, hypsometers, pencils, soil borers

Instructional notes:

Basic tallying of data will be done in the field location. Computation and interpretation of data may be performed in the classroom.

Fallen Timbers staff and class instructor will instruct students on techniques for survey at each field stop. Instructor should be familiar with the use of diameter tapes, compass, increment borer, tree hypsometer

Class ______________________ Instructor ______________________

Location ______________________ Time __________ Date __________

Weather ____

Team Cruiser ______________________ Forest Ecologist __________

Tallyman ______________________ Scaler ______________________

Forestry Aide ______________________

Activities

A. Learn to identify four or more kinds of trees of this forest. The instructor will point out the identity features of trees commonly found in the stand. Write down the name of the tree, an abbreviated code symbol and list several identifying features for each tree.

	TREE	ABBRE.	IDENTIFYING FEATURES
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			

B. The Point Quarter Survey

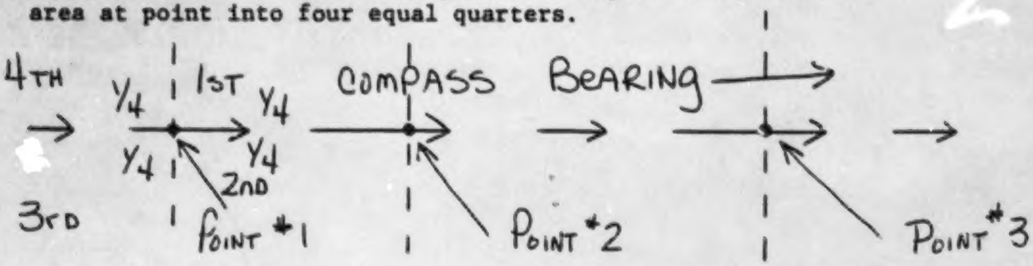
Foresters use various sampling methods to estimate potential yield and readiness of a forest site for cutting. The point quarter method gives important ecological information on species composition and importance, stems per acre, growing space, basal area dominance and total basal area.

The technique is plotless. The results are often more representative of the average forest stand than those obtained by using plot type sampling methods because this method takes the forester through the stand with a minimum of bias.

1. All crews proceed along a given compass direction while sampling:

Assigned compass bearing __________ degrees.

2. Tally person keeps place for point on compass line, divides area at point into four equal quarters.



3. Scaler takes tape to nearest tree 4 inches (10 cm) or more dbh in each quarter. Scaler calls out distance and diameter dbh of tree and its identity. Cruiser and other team members assist with identity and measurements.

Steps:
   - a. Identify tree
   - b. Measure dbh
   - c. Measure distance from tally point to center of tree

4. Tally person records. Record dbh to nearest 1/2 inch.

   - a. Tree abbreviation
   - b. Dbh
   - c. Distance

Example:

POINT	QUADRANT 1	QUADRANT 2	QUADRANT 3	QUADRANT 4
#1	A/12/14	RM/22/25	GA/8/32	RO/24/3

*Note - A=Aspen RM=Red Maple GA=Green Ash RO=Red Oak

5. Crew walks 1 chain (66 feet or 13 paces) and does the same for points #2, #3 etc. 4-10 points to be done as time available. Follow compass bearing as nearly as possible.

6. Cruiser assists tally person and scaler; also directs the ecologist and forestry aide to study forest site along transect for important ecological notes.

(See Part C)

Tallyman's Tally Sheet - FOREST SAMPLING SURVEY

Point Quarter Method - Insert abbreviation, diameter and point/trunk distance for each quarter at each station.

Point Quarter Tally

	Quadrant 1			Quadrant 2			Quadrant 3			Quadrant 4		
1.												
2.												
3.												
4.												
5.												
6.												
7.												
8.												
9.												
10.												
Tree-Point Totals												

Total Tree-Point Distance ________

Followup Activities

1. Numerical importance--total the number of trees of each kind.

	Tree Abbrev.	Total		Tree Abbrev.	Total		Tree Abbrev.	Total
1.			5.			9.		
2.			6.			10.		
3.			7.			11.		
4.			8.			12.		

Total No. Trees ________________

Decide which trees are most important by number: (numerical dominance)

1. ____________________ 2. ____________________

2. Find stems per acre (stocking density)

a. Add all tree to point distances in the point quarter survey. (see point quarter tally).

b. Divide the total of tree to point distances by the number of trees tallied in the point quarter survey.

Total distances divided by number of trees = average distance

$$TD \div TN = AD$$

TD __________ ÷ TN __________ = AD __________

c. Square the average distance (AD) to get space occupied (S)

Space occupied (S) = Average distance squared (AD^2)

$S = AD^2$

S __________ = AD^2 __________

d. To find stems per acre use the formula below:

Area (A) - space occupied (S) = stems per acre (SA)

$A \div S = SA$

Area of 1 Acre = 43560 ft^2

43560 ÷ S __________ = SA (in acres) __________

The number of stems per acre gives the forester an indication of the stocking density of the stand. Stocking density plus average basal area and average diameter gives the forester an idea of how dense the stand is compared to what the stocking density would be for best growth and timber production.

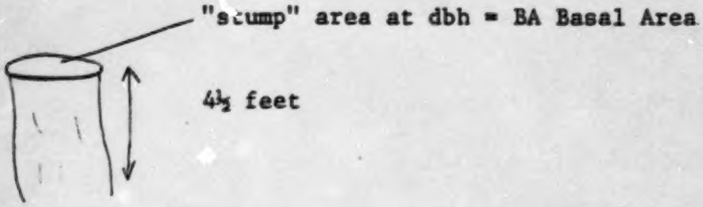
How well stocked is this stand in relationship to a normal good growth stand?

Is the stand: Fully stocked ____ Overstocked ____ Understocked ____

To determine the answer for proper management, the basal area volume and average diameter breast height must be determined.

Basal Area Calculations

Basal area is the area of the tree as if it were a stump cut at diameter breast height (dbh). Basal area measured in a stand may be compared to Basal Area Guides to determine whether a stand is understocked, well stocked or overstocked. The Basal Area Guides aid the forest manager to determine if a forest stand is ready for a harvest cut.



Formula for Basal Area is the Area of a Circle Formula.

$A = \pi r^2$/Area = Pi x radius squared

Directions:

Use the conversion table below. Take the dbh diameters recorded in the point quarter tally. Find the area conversion for each dbh recorded. Record each tree species, dbh and area conversion in the Basal Area Conversion Table. Add total dbh and total BA at the end of the table.

Conversion of Diameter Measurements to Circular Area Values.

Diameter	Area	Diameter	Area	Diameter	Area	Diameter	Area
4.0	12.6	18.0	254.5	32.0	804.2	46.0	1661.9
4.5	15.9	18.5	268.8	32.5	829.6	46.5	1698.2
5.0	19.6	19.0	283.5	33.0	855.3	47.0	1734.9
5.5	23.7	19.5	298.6	33.5	881.4	47.5	1772.0
6.0	28.8	20.0	314.2	34.0	907.9	48.0	1809.6
6.5	33.2	20.5	330.1	34.5	934.8	48.5	1847.4
7.0	38.5	21.0	346.4	35.0	962.1	49.0	1885.7
7.5	44.2	21.5	363.1	35.5	989.8	49.5	1924.4
8.0	50.3	22.0	380.1	36.0	1017.9	50.0	1963.5
8.5	56.8	22.5	397.6	36.5	1046.3	50.5	2003.0
9.0	63.6	23.0	415.5	37.0	1075.2	51.0	2042.8
9.5	70.9	23.5	433.7	37.5	1104.5	51.5	2083.1
10.0	78.5	24.0	452.4	38.0	1134.1	52.0	2123.7
10.5	86.6	24.5	471.4	38.5	1164.2	52.5	2164.7
11.0	95.0	25.0	490.9	39.0	1194.6	53.0	2206.2
11.5	103.9	25.5	510.7	39.5	1225.4	53.5	2248.0
12.0	113.1	26.0	530.9	40.0	1256.6	54.0	2290.2
12.5	122.7	26.5	551.5	40.5	1288.2	54.5	2332.8
13.0	132.7	27.0	572.5	41.0	1320.2	55.0	2375.8
13.5	143.1	27.5	594.0	41.5	1352.6	55.5	2414.2
14.0	153.9	28.0	615.7	42.0	1385.4	56.0	2463.0
14.5	165.1	28.5	637.9	42.5	1418.6	56.5	2507.2
15.0	176.7	29.0	660.5	43.0	1452.2	57.0	2551.8
15.5	188.7	29.5	683.5	43.5	1486.2	57.5	2596.7
16.0	201.1	30.0	706.9	44.0	1520.5	58.0	2642.1
16.5	213.8	30.5	730.6	44.5	1555.3	58.5	2687.8
17.0	227.0	31.0	754.8	45.0	1590.4	59.0	2734.0
17.5	240.5	31.5	779.3	45.5	1626.0	59.5	2780.5
						60.0	2827.4

Basal Area Conversion Table - see data on Point Quarter Tally

Point	Quadrant 1			Quadrant 2			Quadrant 3			Quadrant 4		
	Sp	dbh	BA	Sp	dbh	BA	Sp	dbh	BA	Sp	dbh	BA
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
	ST BA			ST BA			ST BA			ST BA		
	ST dbh			ST dbh			ST dbh			ST dbh		
										Total BA		
										Total dbh		

Total Basal Area for each tree species - add total basal area for each species recorded in the point quarter tally.

Tree	BA Total	Tree	BA Total

Which tree species shows Basal Area Dominance? ______________________________

The basal area dominant species produces the most wood volume on a forest site. Is this the same species which has numerical dominance (has the greatest number of trees in the sample)? _______ If not, which tree species shows numerical dominance? ____________________

Obtain average dbh by dividing total dbh by the number of trees in the tally.

Total dbh __________ ÷ Total Trees __________ = Average dbh __________

To obtain basal area per acre do the following calculation:

Find your figures for: Stems per acre

Total basal area

Total trees tallied

Insert each figure into formula:

BA/Acre ____________________ ÷ Total BA ______________________

Stems/Acre Total Trees Tallied ____________

By Cross multiplication, find BA/acre:

Total BA _________ x Stems/Acre _________ ÷ Total Trees Tallied

= BA/Acre _________

C. Forest Site Survey - general features of site ecology

Basal Area Guides used for management practices depend on forest type and forest site quality. The forester should be familiar with site factors to best evaluate site quality. Each forest crew should take notes on the following features of site quality in the general area of the forest cruise.

1. Note the following features for trees growing on the site.

   a. Species

   b. Cover (% of crown cover)

   c. Form (branchiness)

   d. Successional stage

   e. Pathology (signs of fungus or insect damage)

   f. Height of dominants. Use hypsometer 66 feet from 2-3 dominant trees.

   g. Age

      1. Mixed or even aged
      2. Age of larger trees by increment boring
      3. Growth rate (outer layer in years per inch)

   h. Reproduction

      1. Amount
      2. Type

2. Shrub layer
    a. Species
    b. Density
    c. Reproduction
3. Soil characteristics
    a. Depth of A layer and organic content
    b. Particle type
    c. Structure
    d. Nature of B layer
4. Water/Moisture aspects
5. Topography of site
6. Ground cover
    a. Common species (herbs, grasses, mosses, mushrooms, etc.)
    b. Condition
7. Animal life and signs

Discussion

Pool your information on site ecological factors, spacing basal area, etc. Answer these questions.

1. What is the forest type?
2. What is the condition of the stand? Is it growing well or poorly, why?
3. What might be the site quality in relation to growth potential for a good forest stand?
4. Does the stand need thinning, planting, harvesting?
5. How might the stand be managed?

Reprint:
Project I-C-E RMC
1927 Main Street
Green Bay, WI 54301

Environmental Activities Training Project
Fallen Timbers Consortium Schools
1927 Main Street, Green Bay, WI 54301

Title: The Forester at Work II: Timber Stand Inventory

Recommended Grades: Seasons: 10-12 All seasons, excellent winter activity

Author: George Howlett, Jr.

Concepts:	Integrated with:
3. Carrying Capacity	Advanced Biology
9. Management	Conservation
10. Economic Gains	Agriculture
12. Stewardship	Economics
	Mathematics

Objectives:

Students will inventory the volume of growing timber and pulpwood in test plots by using standard forest measuring tools. Students will calculate estimates of board feet and pulp volumes on a per-acre basis. Students will review various methods of timber stand management and conservation.

Reference for class use:

Forestry Manual for Vocational Agricultural Instructors, Wisconsin Department of Public Instruction

Equipment:

Diameter tapes, log scale sticks, hypsometers, tape measures, tally boards and sheets, pencils, increment borer

Instructional notes:

Basic tallying of data will be done at the field locations. Computations and interpretation of data may be performed in the classroom. Prior discussion of pros and cons of cutting methods may be done in class in order to facilitate the field work.

Fallen Timbers staff and the class instructor will instruct students on methods of measurement at each field stop and will check the students on proper use of measurement techniques as the exercise proceeds.

Activities:

A. Previous Discussion - Forest Management Methods

Forests are cut by several methods. Fallen Timbers staff will explain the use (and abuse) of various cutting procedures.

1. Selective harvest cut
2. Diameter limit cut

3. High grading
4. Improvement and sanitation cut
5. Clear cut
6. Release cut
7. Intermediate cut

Selective Harvest Cut

Cut for continuous yield by selecting mature timber, ripe for harvest. Allows release of sub-dominants to take over stand. Maintains most efficient competition. Removes diseased and defective trees as part of overall management. Used in climax type stands. Has value for long-term continuous yield.

Diameter Limit Cut

All merchantable trees over certain diameter are cut. No management. Done for short-term maximum profit without thought of stand future. Usual diameter 14 inch d.b.h.

High Grading

Cutting only selected species and selected quality of trees. Allows weed and defective trees to remain. Stand quality declines. Stand composition changes.

Improvement and Sanitation Cut

Stands are thinned because they are too dense. Defective, diseased, and weed trees are removed to improve stand quality. Economic benefits are smaller now but will be greater in the future.

Clear Cut

All merchantable trees are cut. Pulp and pole trees are sold along with timber trees. Ground may be bulldozed.

a. May be part of management plan for pioneer forest regeneration which needs open sunlight. Will improve game habitat for deer and grouse.
b. May be short term gain condition for perhaps temporary land holder who does not care for forest renewal e.g. real estate developer or agent, farmer who wants to clear for agriculture, or someone who does not understand forest conservation values.
c. May be done to sanitize forest because of pest outbreak.

Release Cut

Less valuable overtopping trees and wolf trees are cut when their shade interferes with the growth of more valuable undergrowth trees. Often done where trees have been planted under a cover crop of older trees.

Intermediate cut

Plantations and natural stands of pine are periodically thinned to allow crop trees to reach maturity. After the final harvest of crop trees, a new rotation is planted. Used on an even aged stand which does not require clear cut management.

B. Timber Cruise

An estimate of standing timber volume in merchantable board feet.

Foresters must estimate the timber volume standing on a forest site. They determine volume in board feet.

Loggers contracting to cut a forest stand use a timber cruise estimate when bidding for a timber sale. This bid will be for the stumpage rights; the right to cut the salable timber. The stumping value is the price the logger will pay based on board foot volume, species, and log grades expected to be cut. Landowners should have a forest cruised before selling stumpage rights.

In preparing a selective cut, the forester estimates volume only for the trees marked for cutting. For management purposes the basal area is recorded for all live trees over 12 inches (27 cm) dbh. Basal area plus an estimate of the number of 16 foot logs gives sufficient information to decide how much timber should be marked for cutting.

Procedure:

1. Measure diameter breast height 4½ feet above ground (dbh) on trees over 12 inches (27 cm) dbh.
2. Identify species of tree recorded.
3. Record dbh next to species.
4. From 1 chain (66 feet) find number of merchantable logs (to nearest ½ log) to 8 inch top. Use hypsometer on log scale stick.
5. Record number of merchantable logs next to species.
6. Find board foot value on tree scale stick.
7. Record board foot (BF) next to species.
8. Determine BF for each species in sample.

Timber Cruise Data Table

Tree #	Species	dbh	# logs	BF	Tree #	Species	dbh	# logs	BF
1					11				
2					12				
3					13				
4					14				
5					15				
6					16				
7					17				
8					18				
9					19				
10					20				

Sub Total BF ____ Sub Total BF ____

If plot size is 1/5 A., multiply by 5 to get BF per Acre. If plot size is 1/10 A., multiply by 10 BF per acre estimate ________

Species Composition Data Table

Tree	Species	BF/Species
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

Discussion

Discuss the economic value of this forest stand with reference to:

a. Wise management by selective harvest

b. Non-management cutting and its economic impact

c. Long range need of productive forests in the local and national economies

d. Species composition and log grade

C. Pulpwood Cruise

Pole size timber of appropriate species are cut in 100 inch (8.3 ft) logs and stacked in cords (4 x 4 x 8 feet). Appropriate species are aspen, spruce, red pine, oak, white birch. Other species may be sold to pulp mills using special processing techniques. Pulpwood is cut to a 4 inch top diameter o.b. (outside bark).

1. Use a hypsometer scaled in 8 ft. subdivisions. Stand one chain (66 feet) from each appropriate tree and determine the number of pulpwood sticks that can be obtained from each pulp tree. Top diameter must be 4 inches or more.

2. Find diameter breast height (dbh) for each tree scaled (convert diameter decimeters to inches by dividing by 2.5)

3. Record number of pulp sticks in appropriate dbh column in pulpwood tally sheet for each tree scaled.

Pulpwood Tally Location ______________________________

Record number of sticks per tree for each tree tallied

DBH													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													

4. Determine cord volume for all trees tallied from Tree Volume in Cords table. Record volume value in Volume Tally Table for each tree scaled.

Tree Volume in Cords (100 inch pulp sticks)

DBH in inches	Merchantable Length of Tree					
	1 stick	2 sticks	3 sticks	4 sticks	5 sticks	6 sticks
6	.02	.03	.04	.06	---	---
7	.02	.04	.06	.07	---	---
8	.03	.05	.07	.09	.12	.14
9	.04	.06	.09	.11	.14	.16
10	.05	.07	.10	.13	.17	.20
11	.06	.08	.12	.15	.19	.23
12	.07	.10	.14	.18	.22	.27
13	.08	.11	.16	.20	.25	.31
14	.10	.13	.18	.23	.29	.35
15	.11	.15	.20	.26	.33	.39
16	.12	.17	.22	.29	.36	.44

Volume Tally Table for Pulpwood Plot

Tree No.	Cords	Tree No.	Cords	Tree No.	Cords	Tree No.	Cords
1		11		21		31	
2		12		22		32	
3		13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	
Sub-Total		Sub-Total		Sub-Total		Sub-Total	
						Total Cords	

5. For 1/10 A, multiply cords by 10 for cords/Acre.

   _____ cords in plot x 10 ______ cords/acre (est.)

6. For peeled cords deduct 12% from total of unpeeled logs.

7. For solid cubic feet wood multiply cd/A x 79.

Notes: (1) Plywood cutting is often done on a clear cut basis. The number of cords per acre times the acre size of the clear cut gives the cords for the cutting job. Proper sampling requires sampling in a number of locations over the forest area to be cut.

(2) Aspen must be clear cut to get good natural production of aspen for the next cutting rotation.

Discussion:

Discuss the economics of this pulpwood stand from the point of interest of:

1. The landowner
2. The pulpcutter and pulp contractor
3. The paper company
4. The local economy

Fallen Timbers Activity Series
Fallen Timbers Consortium Schools
1927 Main Street, Green Bay, WI 54301

Reprint:
Project I-C-E RMC
1927 Main Street
Green Bay, Wisconsin 54301

Title: **Bugs About Insects**

Recommended Grades: Seasons: 5-8 Late Spring, Summer, Early Fall (to October 15)

Authors: George Howlett, Jr.

Audrey Thede

Adapted from: Trapping Insects and Kinds of Bugs, Major L. Boddicker, Chester, South Dakota

Concepts:
2. Ecosystem
3. Carrying Capacity
10. Economic Gains

Integrated with:
Science

Objectives:

Students will discover some of the great variation in insects by collecting and observing insects residing in various major habitat types.

Students will use various methods for collecting insects which will expose for them various habitats in which insects live.

Students will note variation in detail within the common body plan for insects by describing different insects of interest.

Equipment supplied at Fallen Timbers:

Collecting jars, sweep nets, beating sheet, insect sieve, pinning materials, aquatic nets, identification books (Peterson Guide to Insects, Peterson Guide to Butterflies, How to Know the Insects, How to Know the Immature Insects, How to Know the Beetles, How to Know the Grasshoppers, Wasp Studies Afield, Pond Life Golden Guides, Golden Guide to Butterflies and Moths, plus several books on insect natural history), clipboards, can traps, trowels, white enamel pans, hand lens.

Please provide:

Copies of study sheet, pencils, bait (sugar syrup or molasses, bits of meat).

Background information to teacher:

There are more than one million species of insects on earth occupying most habitat areas except the open ocean. All are members of local food chains and significant food sources to various predatory animal forms. Many are directly beneficial to man such as the bees and butterflies which pollinate many crops.

Some insects are harmful to man, mostly because man has set up ideal habitat conditions for their needs or has destroyed natural predators. Some are highly irritating to us, however, they fit into natural food chains; like mosquitoes which are an important food to swallows, swifts and other birds. Some are carriers of disease such as sleeping sickness, yellow fever, malaria, etc. The elm bark beetle carries the Dutch elm disease which has killed so many trees here at Fallen Timbers.

Most insects are neutral to man's interest but play some key role in the living community in which each resides. Each has a niche or place in the community. We should learn more about insects, their variety and their ecological function. We must learn to respect their place in the environment and learn the most ecologically sound way to reduce the impact of those insects seriously harmful to man.

Collecting notes:

Permit students to find as many insect types as possible. Demand that insects be released except those you wish to kill and take back to the classroom for mounting.

Insects may be killed at the laboratory by using a few drops of ethyl acetate solution in the cotton-filled sections of the collecting jars.

Bees pollinating flowers usually do not sting unless greatly disturbed. Nevertheless, request that students use caution. Keep sting allergic children away from areas where bees are active.

I. Pre-Trip Activities

A. Make drawings of the basic body plan of an insect.

B. Learn about 8 important groups of insects (orders).

C. How many legs do insects have, how many wings?

D. List the different types of insects of which you can think.

E. How do insects help man?

F. What insects are harmful to man?

G. What insects are neutral to man normally?

H. What do insects eat?

I. What can you find out about insect life styles?

J. What are "grubs", larvae, pupae, cocoons?

K. Investigate the world of social insects such as bees and ants.

II. Field Activity

Team organization: Students should be organized into teams of three. One net and one catching jar will be assigned to each team, also one clipboard and field sheet and 5 tin cans, bait and one hand trowel.

A. Insect Trapline

Teams will set out 5 tin can traps with a small amount of bait in each can. Locate the traps in different habitats. With a trowel dig a hole, set the baited can in the ground so that the top is level with the ground and leave the trap until later.

If staying overnight, set traps in the evening. If coming for all day, set traps early in the day and collect them before leaving.

Set traps in woods, in rotten wood or stump, under bushes, in the open meadow. Note the following information when you collect the trap. (Please return cans to Center.)

CAN #1 Habitat ______________________________

Number of insects in can ________ Number of insect types in can ______

Describe one insect ______________________________

CAN #2 Habitat ______________________________

Number of insects in can ________ Number of insect types in can ______

Describe one insect ______________________________

CAN #3 Habitat ______________________________

Number of insects in can ________ Number of insect types in can ______

Describe one insect ______________________________

CAN #4 Habitat ______________________________

Number of insects in can ________ Number of insect types in can ______

Describe one insect ______________________________

CAN #5 Habitat ______________________________

Number of insects in can ________ Number of insect types in can ______

Describe one insect ______________________________

Count the number and types of each insect. Select one of each type and place in collecting jar. Release all other insects. Take collecting jar to your teacher to show the variety you have found. The teacher may select insects for mounting in the laboratory or classroom.

B. A Clean Sweep

Each team will use the "sweep net" to catch insects on and around the vegetation. Do not chase after butterflies. Watch for sitting insects and sneak up on them with the net. Use the net properly by sweeping it through the grass. Have the instructor demonstrate the proper use of a sweep net. Protect the net from damage by sharp twigs etc.

1. Meadow Habitat

For 5 minutes "sweep" the net through the grass and around flowering plants. Be careful of bees, wasps, etc. You may select one insect of each type to place in the collecting jar. Count the number of insects of each type captured. Release all other insects.

____ Bees
____ Wasps
____ Flies
____ Moths
____ Butterflies
____ Beetles
____ Leaf Hoppers
____ True Bugs (Hemiptera)
____ Dragonflies
____ Grasshoppers
____ Crickets
____ Lace Wings
____ Mosquitoes
____ Other
____ Other
____ Other

2. Brush and Woodland Habitat

Go to a brushy wooded area and again "sweep" the vegetation for a short time. Count the number of insects of each type. Select one of each type to place in the collecting jar and release all others. Be careful not to damage the net!

____ Bees
____ Wasps
____ Flies
____ Moths
____ Butterflies
____ Beetles
____ Leaf Hoppers
____ True Bugs (Hemiptera)
____ Dragonflies
____ Grasshoppers
____ Crickets
____ Lace Wings
____ Mosquitoes
____ Ants
____ Other
____ Other

C. Waterbugging DO NOT USE SWEEP NETS IN WATER.

Using the aquatic dip net at the edge of the pond, collect samples of aquatic insects and insect larvae. Note the kinds of insects found. Insects have 6 legs. Larvae may have 6 legs or may not have apparent legs. You will find animals which are not insects. Stay alert. Sample insects may be kept in water in the enamel pans. Release all others back to the water.

____ Mayflies

____ Mayfly larvae

____ Dragonflies

____ Dragonfly larvae

____ Stone flies

____ Springtails

____ Water Boatmen

____ Water Striders

____ Giant Water Bug

____ Back Swimmers

____ Diving Beetles

____ Whirlagig Beetles

____ Caddisfly larvae

____ Mosquito larvae

D. Beating About the Bush

Using the beating net supplied by the Center, one team may place the white sheet under a bush or low tree and beat the leaves with sticks. Insects will fall into the white sheet. They should be quickly picked from the sheet and placed in the collecting jar. Release all but one of each type.

Number of types of insects __________

Describe carefully 2 insects you have found in this exercise.

#1 ____

____

____

#2 ____

____

____

E. Bugs in the Woodwork

Option: The teacher may wish to use the exercise "Nature's Recycling System #2" for a more complete study of wood decomposer animals.

In an area where old logs and stumps are on the ground, probe with your trowel for examples of different types of wood rotting insects and their larvae. Stay alert. You will find many non-insect animals.

How many types of animals did you find? __________

Describe 2 insects found in this exercise.

#1 ____

____

____

#2 ____

____

____

F. Dirt(y) Bugs

One team will use a trowel or small shovel to search for insects inhabiting the soil. From a likely area dig soil down about 3-4 inches. Sift it through the insect sieve, identify and count the insects of each different type. Try the edge of the pond, the muck swamp soil, soil at the edge of the forest and a place where there is leaf litter. Place one insect of each type in the collecting jar. Release all others.

Habitats sampled: ____

____

Number of insect types found __________

Describe 2 insect types.

#1 ____

____

____

#2 ______________________________

____

____

G. Counting Up

At the cabin, turn your collection over to the teacher. Teams will check each collecting jar to view the variety of insect types collected. Try to determine how many kinds of insects were found today.

Number of insect types found ________

The teacher may select insects to be taken back to the classroom. If they must be killed for mounting, the teacher and Fallen Timbers staff will use ethyl acetate as a killing agent.

If there is time, students may mount killed insects by pinning them and placing them on a spreading board. This is a good exercise for a small number of students staying for overnite camp. Only 8 students may use the laboratory at one time under staff or teacher supervision.

Students may more carefully observe collected insects in the lab using hand lens, microscopes and insect books. Only 8 students will be permitted in the lab at one time.

Students staying in camp overnite may collect insects at night around the overhead light or around camp lanterns. Be careful not to knock over gas lanterns.

H. Habitat Review

Discuss at the cabin or back in class.

Pond

1. Why do some insects live within certain areas of the pond?

2. Are some insects found in all areas of the pond?

3. What are jobs or functions of insects in the pond community?

4. Are the pond insects dependent on each other?

5. Why are some insects in the pond more numerous than others?

Meadow

1. Why do certain insects live in certain areas of the pond?
2. What attracts bees to the meadow in fall?
3. What are the jobs or functions of the meadow insects?
4. How does the goldenrod gall fly complete its life cycle?
5. Which insects are most numerous in the meadow and why?

Forest

1. Are the insects of the forest and meadow all the same?
2. Does the forest cover provide more protection than the meadow?
3. What is the primary job of the wood dwelling insects?
4. Are there more poor flyers in the woods than in the meadow?

Soil

1. How are soil insects different from those in the meadow & forest?
2. What do insects do in the soil community?
3. Why would you find more insects in one soil type than another?

III. Post Trip Activities

1. Investigate the ecological role of insects. Build food chains involving insects in the wild.
2. Investigate how agriculture has created good breeding conditions for pest insects.
3. Find out about natural methods of insect control.
4. Investigate pesticide safety for farm operators.
5. Mount and exhibit the variety of insects collected during your field studies.
6. Read a book about insects and their habits.